
finish
FROM RAW METAL TO FINISHED PRODUCT

# CHEMICAL SHORTAGES mean REDOUBLED EFFORTS.....

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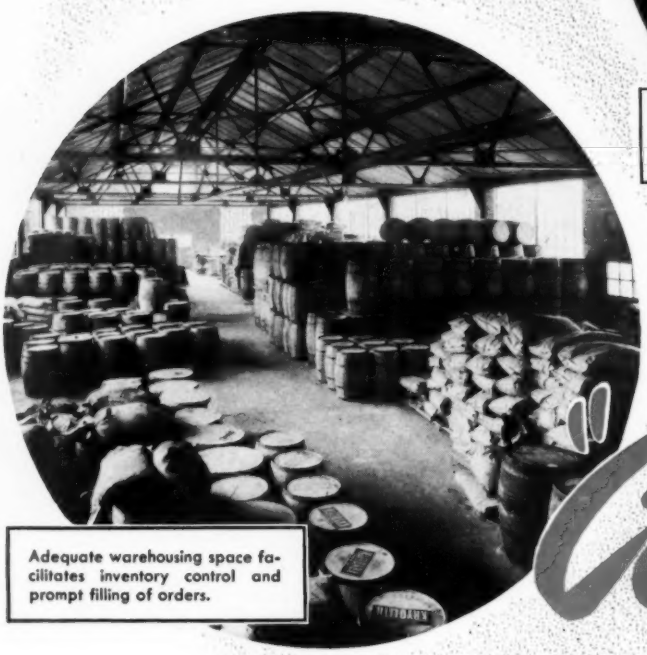

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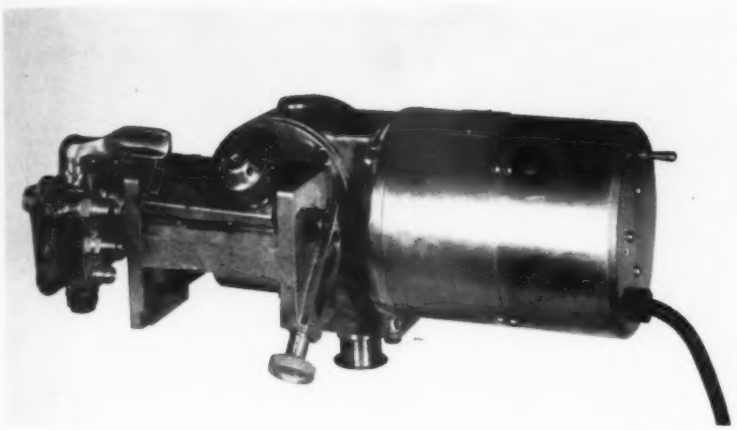
# finish SUGGESTION BOX

## Metal spraying gun with simplified operation



A NEW metal spraying gun, designed especially for coating shafts, rolls, or machine element parts from a lathe mounting, has been introduced. Said to be virtually foolproof in performance, this gun, called the "Mogulectric," boasts a greatly increased spraying speed, and can also be used for spraying tanks and structural members.

Promising substantial savings in time, money and critical parts, the gun metallizes, i.e., adds metal to metal via fine atomization of wire stock at 6300° F. In addition to rebuilding worn parts, it is claimed ideal for spraying corrosion-resistant metal coatings and for reclaiming mis-machined castings and machine parts.

The gun weighs 20 pounds, thus is designed principally for stationary operation. It is powered with a 1/20 hp constant speed induction motor, and can be adjusted to the type of metal being sprayed.

The new gun will spray #15 B. & S. gauge wire up to 3/16" diameter, from the lowest melting point metal to the highest. Speed is rated up to 18 pounds per hour for aluminum and nickel, and up to 80 pounds per hour for zinc. Only one adjustment is necessary — that of the variable speed indicator which is regulated according to the metal being sprayed.

When spraying 3/16" stainless steel, the Mogulectric uses 44 cubic feet of acetylene and 68 cubic feet of oxygen per hour. The air used to atomize and carry the metal to the surface being coated is 16 cubic feet per minute at 45 pounds pressure.

***Source for further information on this metal spraying gun may be obtained by writing* finish.**

## WORLD METALLURGICAL CONGRESS IN DETROIT, OCT. 14-19

More than 500 top-ranking metal scientists and engineers from the free nations of Europe, Africa and Asia, as well as from North and South America, will gather in Detroit, Michigan, October 14 through 19, for the first international World Metallurgical Congress.

The "conferees" from upwards of 20 countries will assemble for an "exchange of ideas" and join with thousands of American metallurgists who will participate in the Congress, according to Walter E. Jominy, Chrysler staff engineer, and president of the American Society for Metals which is sponsoring the world scientific meeting concurrently with the 33rd annual National Metal Congress and Exposition.

Eight major industrial problems expected to be surveyed by the conclave of metal experts include:

1. The need for uniform terminology and research techniques among metal scientists of the free world.

2. The lack of a system or agency to transcribe and translate data from one nation to another.

3. The need for increased means of give-and-take between scientists engaged in basic research "especially where international exchange of basic research ideas would not endanger national defense."

4. The need for accurate knowledge of metal shortages according to countries, and the means of relieving them. (In this connection, Jominy disclosed that the first session of the Congress, on October 14, will feature the world's first open discussion of metal resources.)

5. Insufficient knowledge of the effects of nitrogen and other components in alloy steel.

6. The need for more research on alloy steel behavior at extreme high and low temperatures—particularly for use in newly developed jet and fission propelled engines.

7. The high cost of new alloys and need for less expensive production methods for such newly developed metals as zirconium, titanium, vanadium, molybdenum, and others still in development stages.

8. Finally, the need for greater knowledge concerning high frequency electric currents in processing metals.

# MEETINGS

### CENTRAL ENAMELERS OUTING

The Central District Enamelers Club fall outing is scheduled for September 8, at Alliance Country Club, Alliance, Ohio.

### NATIONAL METAL TRADES ASSN.

The National Metal Trades Association will meet September 26-28 at the Palmer House, Chicago, Ill.

### ENAMELERS SHOP PRACTICES FORUM, OCTOBER 10-12

The annual shop practices forum of the Porcelain Enamel Institute will be held this year at Ohio State University, Columbus, Ohio, October 10, 11 and 12.

### FIRST WORLD METALLURGICAL CONGRESS, OCTOBER 14-19

The first international World Metallurgical Congress will be held in Detroit, October 14-19. (See news story on Page 11.)

### AGA CONVENTION IN ST. LOUIS

The 33rd annual convention of the American Gas Association will be held in St. Louis, Missouri, October 15, 16 and 17.

### PAINT INDUSTRIES MEETINGS OCTOBER 29 TO NOVEMBER 3

The annual convention of the National Paint, Varnish and Lacquer Association will be held in Atlantic City, October 29-31, and immediately following will be the annual convention of the Federation of Paint and Varnish Production Clubs, November 1-3.

### PEI ANNUAL MEETING, OCT. 31

The annual meeting of the Porcelain Enamel Institute will be held at The Greenbrier, White Sulphur Springs, W. Va., October 31, November 1 and 2.

Camera: 2¼ x 3¼ Busch pressman camera, f/16, 60 watt second Bantam strobe light
Film: Plus X film pack (speed of chuck was 1250 rpm)

*"Precision Machining"* by R. A. Martinson
Hammel Radiator Engineering Co., Los Angeles

**TEN DOLLARS will be paid for black on white 8x10 enlargement chosen for this page. Sports subjects or plant operations given preference.**

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# Maintenance by metallizing

*by Gilbert C. Close* • FINISH CORRESPONDENT

IN times like these, with production booming and materials and tools growing scarcer by the day, plant maintenance and salvage work assumes major importance. More than tool replacement costs are involved. The time element is vital to production efficiency. The ever-increasing delay in getting replacement tools plus the time required for their installation is a production bottleneck that must be avoided at all costs. The only direct solution to the problem is the employment of maintenance and salvage methods and techniques that will keep old tools going strong and constantly on the job.

To this end, the metallizing process has a lot to offer. While relatively unknown prior to World War II, except in certain types of heavy industry, the critical shortages of that era literally forced the adoption of the process by many plant maintenance departments. The net result was widened experience in the use of sprayed metal and increasing recognition of its versatility. The sudden upswing in the demand for metallizing equipment caused manufacturers of this equipment to instigate investigations and research into equipment and process improvement. Today, with another critical shortage era facing industry, vastly improved metallizing equipment and materials are available to help solve the problem.

*Applications have increased to the point where any shop or factory, regardless of its type or size, can profitably use metallizing equipment.*

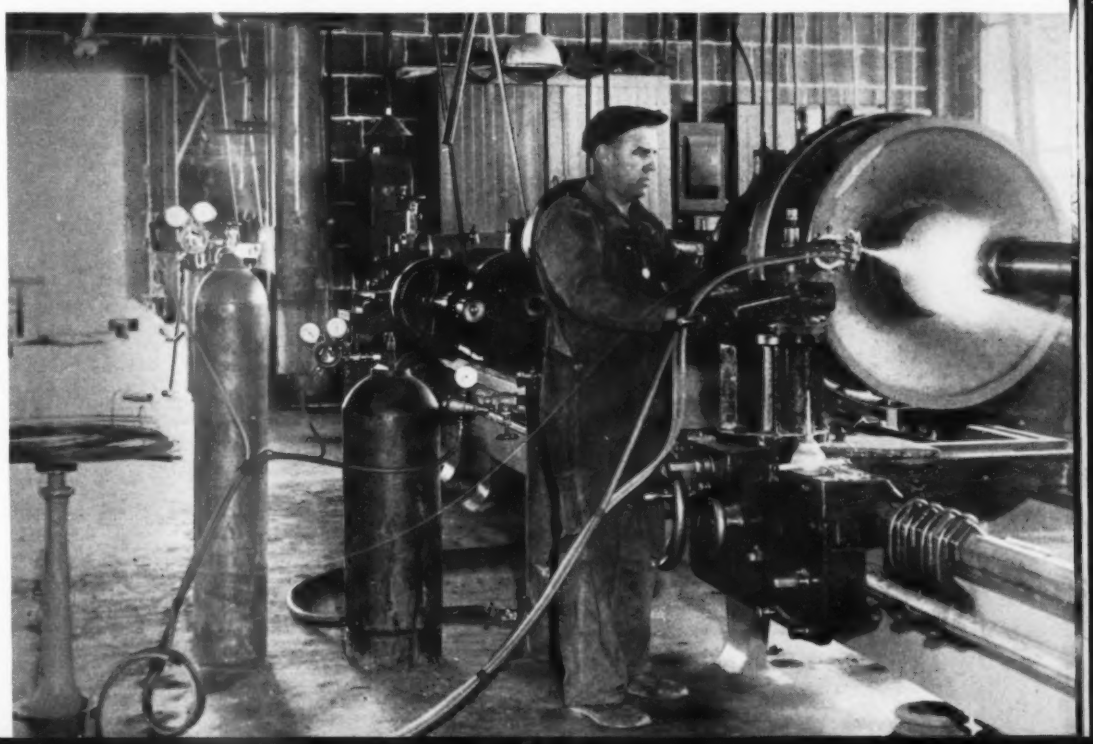
In fact, the applications of metallizing are far too numerous to detail in an article of this type. But a general discussion of the subject will aid anyone interested to visualize numerous applications within his own sphere. The photographs accompanying this article illustrate a cross-section of uses with numerous similar applications hinging on each. A basic knowledge of the process, its advantages and limitations, are all that are needed by any good shop maintenance man to immediately use the process to advantage.

### The mechanics of metallizing

Basically, metallizing is a process wherein a metal wire of the desired alloy or composition is automatically fed into the metallizing gun by means of compressed air actuated feeder mechanisms. As the wire emerges from the nozzle of the gun, it passes through and is melted by an oxy-acetylene flame. Immediately after being melted, the metal is caught up in a projecting air stream where it is atomized and projected against the surface being sprayed.

### Bonding, hardness and surface characteristics

From the metallurgical standpoint, the spray metal does not fuse with the surface on which it is applied, but



*Rebuilding the journal on a ventilating fan.*

*Using an extension tube on a metallizing gun to rebuild the interior of a packing gland.*

secures a bond by keying and hardening around minute surface irregularities which have been provided before hand. On a properly prepared surface, this bonding strength is great enough for all except direct tensile loads. While the tensile strength of the spray metal is not great, its compressive strength is considerable, thus suiting it for all loads in compression as are encountered in bearings, journals, tight fits, pistons, braking drums, etc. When the spray metal is to be used as a protective coating, its bond is sufficient to hold it firmly in place for years.

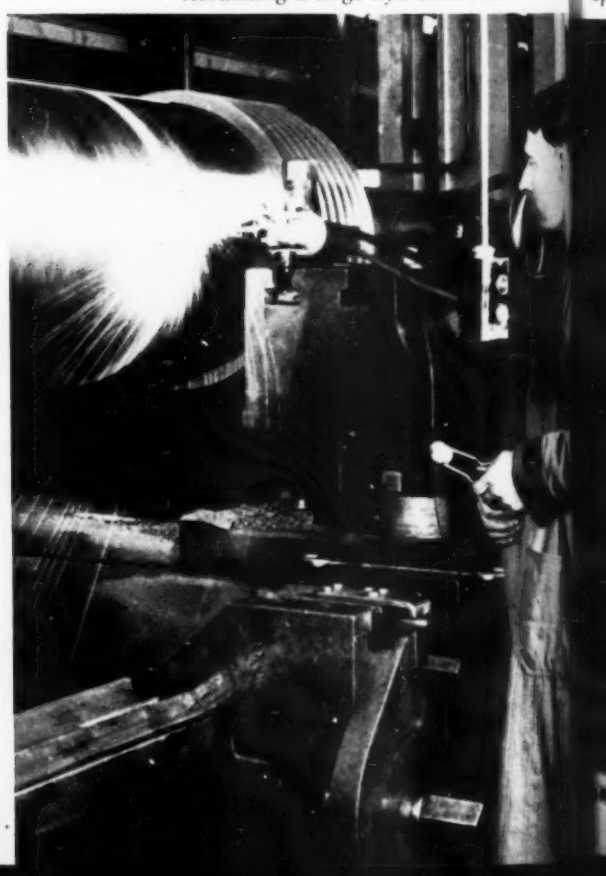
Hardness of the spray metal will, of course, depend upon the hardness of the wire used, though in general the coating will be somewhat harder than the parent alloy due to the sudden quenching of the molten particles as they contact the cool surface being sprayed. All spray metal is somewhat porous. This is a distinct advantage in many wearing applications as the pores absorb oil, giving the surface self-lubricating properties much as are found in sintered bearings. From the standpoint of a coating used to prevent corrosion, the pores are a disadvantage and make necessary a somewhat thicker coating.

### Three use categories for production and maintenance work

The applications of metallizing in either production or maintenance work can be classified in three categories: (1) using a sprayed metal coating to prevent corrosion; (2) using a similar coating to prevent heat oxidation of machine elements or equipment that must operate at high temperatures; and (3) using the spray metal to enlarge or restore the dimensions of the surface on which it is applied. This last category involves a huge number of maintenance operations wherein the sprayed coating is used to salvage machine

*Rebuilding journal on a large rotor. Note that rotor has not been removed from its bed.*

*Rebuilding a large hydraulic ram.*



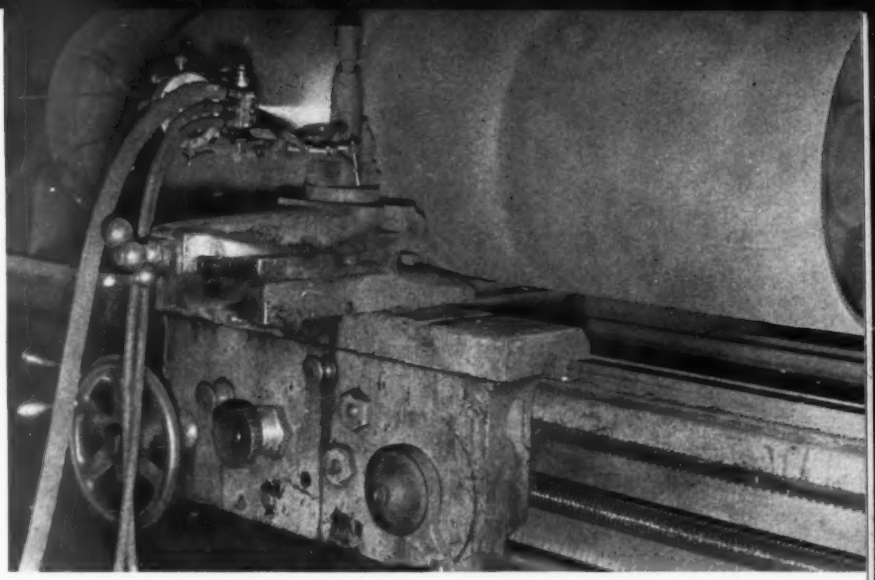
parts and equipment that have been worn beyond further use.

As previously indicated, the surface to be sprayed must be properly prepared before hand. It must be roughened in some manner to produce minute irregularities or "anchor points" around which the spray metal can key and set. Final success of the process depends to a great extent upon proper surface preparation. Several techniques are available for this purpose.

### Techniques for producing bonding "anchor" points

Structural surfaces, large flat surfaces, or irregular-shaped surfaces are usually roughened by grit blasting. Impact of the grit particles with the surface provides the necessary roughness. Circumferential surfaces, such as shaft bearings or journals, pistons, brake drums, etc., are sometimes prepared by rough threading in a lathe. The part is mounted to rotate past the cutting tool in the usual manner, but the tool is sharpened and adjusted at an angle so that it tears the surface rather than producing a clean cut. Rough threading produces a very good bonding surface and can be employed with success on a large majority of machine shop salvage operations.

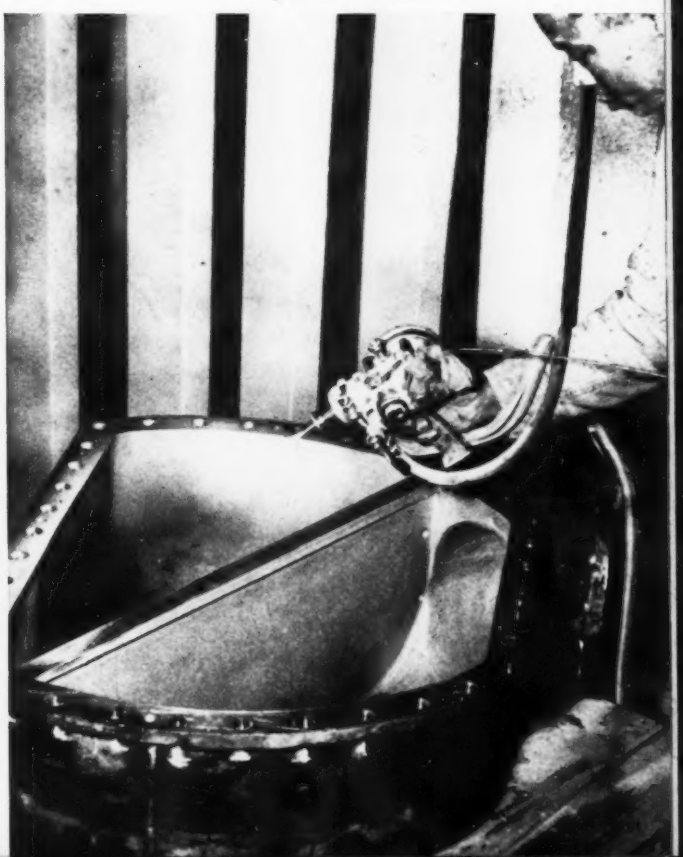
In recent years, the various metallizing equipment companies have developed special techniques and tools for surface preparation. One such technique is called fuse bonding. This is accomplished by a tool somewhat similar to an electric welding torch. The tool is equipped with numerous nickel alloy electrodes (or with a single nickel alloy electrode on one tool model) which are wiped quickly across the surface to be sprayed. The work serves as one pole for the current; the tool as the other. Contact between the tool electrode and the work surface causes arcing, and small particles of the electrode are burned

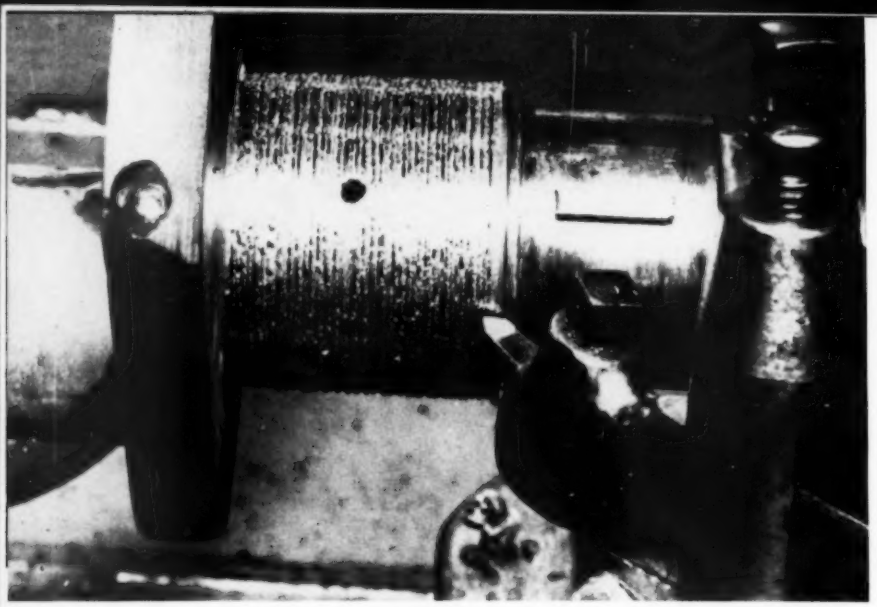


*Rebuilding a large squeeze roll with high carbon steel.*

*Spraying zinc on a weld bead to prevent corrosion.*

*Coating interior of a water chest with aluminum to prevent corrosion.*





*Rough threading a crankshaft journal prior to metallizing. Note roughness of cut.*

off and fuse solidly with the surface. These fused particles provide the necessary surface roughness. The heat generated by this method is so localized and so short in duration that the temper of the metal is not affected. Fuse bonding is usually accomplished by hand, by merely rubbing the electrodes across the surface to be sprayed.

One metallizing equipment company has developed a special shaft preparing tool. This tool incorporates a very hard knurled wheel which is mounted in a lathe by means of an offset shaft or handle. The shaft is mounted in the lathe and the knurled wheel brought firmly against it. As the shaft rotates, the knurls gouge into the surface, producing the required roughness. The tool is moved lengthwise along the shaft by means of a screw feed.

Another development in recent years is a special wire which can be sprayed on smooth surfaces to obtain a fairly good bond. This spray coat then provides a proper bonding surface for additional spray coats of the desired alloy. While effective in many instances where the ultimate in bonding strength is not required, when great bonding strength is required, it is better to roughen the original surface.

There are a few other factors which should be taken into consideration during work preparation when optimum results are desired. When a circumferential surface is only slightly worn, it may be necessary to machine away some metal so that a sprayed coating at least 1/32 of an inch thick may be applied. Thinner coatings are not recommended. Nor should a shaft be rebuilt by metallizing out to its very end. The somewhat brittle nature of the sprayed coating does not provide a good shoulder. A bead can be welded around the end of the shaft, then machined to size and undercut slightly to provide a good anchor for the end of the spray coating. Techniques such as this are best acquired by experience, and are too numerous and variable to list in detail.

**Author's Note:**

**This article has intentionally evaded the employment of metallizing as a production tool. However many companies are starting to use metallizing on the production line with good results. It is used to apply corrosion preventive coatings of aluminum or zinc on small steel production parts. Heat resistant "aluminized" coatings on steel parts are also being applied. The process is being used, also, for salvaging mis-machined production parts, and has proved a great cost-saver in this instance. Some products are being turned out with a final protective coating of sprayed metal, especially such products as piping that will be subjected to salt water inundation, soil piping, structural units, etc.**

*Finish grinding a large turntable to size. Table was salvaged by metallizing.*

### Proper application does not affect metal temper

The spray metal should be applied as soon as possible after surface preparation to prevent oxidation or contamination of the newly roughened surface. Any grease, oil, or other dirt between the spray coat and the base metal will seriously affect bonding strength. Large flat or irregular surfaces are usually sprayed by hand, operating the metallizing gun much like a paint spray gun is manipulated. Circumferential surfaces may be sprayed by mounting the gun on the screw feed in a lathe and applying the spray metal while the part rotates. This later method is widely applicable in most machine element salvage work. In some jobs,

*to Page 78* →

# A job stamping plant must be versatile

**this company does the job from the precision dies to the finished product, or any part of the job—parts vary from refrigerator and range components and washing machine stampings to motor scooters**

*by Matt E. Heuertz* • ASSOCIATE EDITOR

Exclusive feature finish

As we travel around the country visiting the plants of appliance manufacturers and other producers of metal products, we are impressed by the amazing versatility exhibited by these organizations. Through their engineers and skilled plant men, these manufacturers seem always to be prepared to meet all sorts of production problems, no matter how complex or difficult. It is this versatility that seems to be a particularly necessary factor in the organizations with job stamping and job finishing departments.

The subject of this article is New Monarch Machine and Stamping Company, at Des Moines, Iowa, a company that has for almost 50 years served as a source for specialized metal stampings for various segments of the appliance and metal products manufacturing industry, and has during that period developed a number of interesting finished product items which are not competitive with their contract or "jobbing" customers.

New Monarch was founded and, for many years, headed by the late Sigurd E. Anderson, who was well known in the appliance field, particularly throughout the midwest. Present company executives say that it was through his perseverance and determination that a little three-man shop in Des Moines was developed into three modern stamping plants which today employ more than 300 persons.

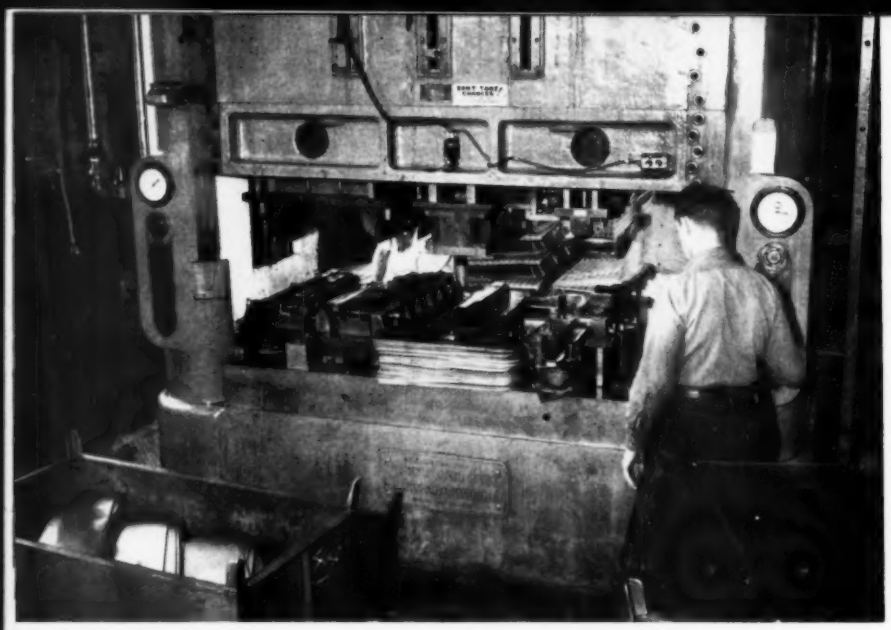
Present heads of the firm include Frank H. Anderson, president; Clarence S. Anderson, executive vice president; Lee A. Shelton, vice president and general manager; Russel W. Smith, secretary, and Arvid C. Anderson, assistant vice president and sales manager. This group has worked together as a team for a number of years, in the management of all phases of operating the three New Monarch plants in Des Moines.

As can be imagined, the scope of the work at New Monarch, in offering a general stamping service, and complete service from blueprint to shipping carton, has included handling practically all kinds of sheet metal, and stamping thousands of different shapes and sizes of parts.

### Special dies and special machines

As was demonstrated during our visit, the company has facilities for producing precision dies and special jigs and fixtures, for welding and other fabrication operations. The company cites examples where, in many instances, the building of special machines was required to facilitate the production of some special high-production component. Press

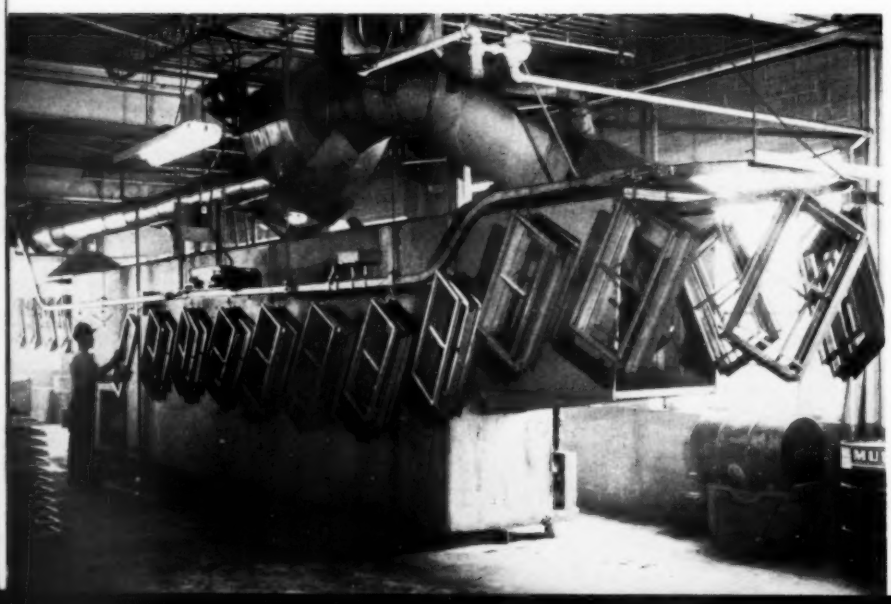
*Double lock-seaming truck flares. Completed flare in seamer. Operator rests hand on a can prior to seaming.*



*Above: Series of dies in a hydraulic press. They are forming, trim both sides, end trim and form tab. Part is leg for washing machine.*

*Left: Projection welding inside and outside of basement windows in one operation.*

*Below: Photo shows windows entering washer.*



facilities range from a battery of small high-speed presses to 500-ton hydraulics. In the welding department there are projection welding machines and 16 spot welders.

### Organic finishes supplied

Although a high percentage of the stamping work done is on components for shipment to finished product manufacturers, the company does complete articles both for contract buyers and for their own products. In this instance, organic finishes of various types are employed. Finishing equipment includes automatic equipment, consisting of an alkali wash, hot water rinse, and dryer. For some types of work, a vapor degreaser is used. Water-wash spray booths are provided for the application of spray finishes. Some finishes are dipped. Baking or curing of the finishes is done in a gas infra-red oven 45 feet long and incorporating 96 burners. Most of the alkyd or synthetic finishes applied are baked at 300-350° F.

### Points of interest

As we continued our trip through the Monarch plants, there were many occasions to stop and ask questions concerning this piece of equipment or that machine.

As an example, there was an automatic machine for putting rubber tires on steel wheels at such a speed that only a good eye can follow the action. To test its effectiveness, all one had to do was attempt to put one of the rubber tires on a wheel without the automatic equipment.

An interesting item of specially designed equipment was a mechanical seamer for completing the fabrication of a "highway flare". In this machine, the seam was crimped five times in a comparatively simple piece of equipment to make a lock-tight seam that withstands a test pressure of 5 pounds.

At one point, we saw the manufacture of a "Bull Dog" floor clip, where seven operations were being accomplished in a single revolution of a semi-automatic press.

In another spot, we saw silo lugs that had been converted from malleable castings to 10-gauge steel. These

are the lugs used to hold rods on cement silos. If this seems out of line, we will explain that New Monarch produces a complete line of silo hardware which for years has been an important part of its business, located as the company is in the heart of the corn belt.

Another item of New Monarch manufacture which fits into the building field is a line of "In-A-Slide" steel basement windows. This is a comparatively new line of manufacture, which was introduced only five years ago, but which the company reports has had an enthusiastic reception in the building field.

We also saw a production line in operation producing a power scooter. New Monarch helped engineer this item, design stampings, fabricate, assemble, finish, pack and ship it for their customer—another example of New Monarch's complete service from blueprint to the finished product.

**Defense production**

The company is now preparing to convert a part of its production facilities to products for defense.

During World War II, production items included army camp stoves, bomb fins, armature laminations, trench mortar fins, rocket fins, water chests, generator end covers, waterproof airtight powder cases, embossed steel caps, high-pressure air tanks, and many other fabricated steel parts. It was customary at that time to ship at least one car of powder cans and one car of bomb fins per day.

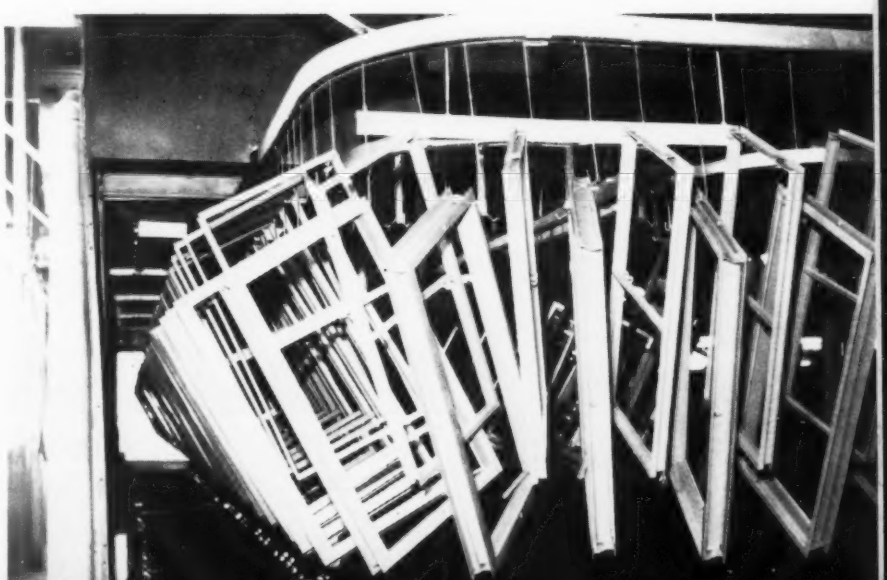
**Versatility counts**

In this day of extremely high production rates on identical items, serving as the general rule rather than the exception, it is interesting to visit a plant such as New Monarch, where both the organization and the equipment must be readily adjustable to both short and long runs on a wide variety of products, which vary in design, metal gauge, fabricating requirements, and final finish. That such versatility can be employed profitably is evidenced by the continuing successful expansion of this Des Moines company over a long period of years.

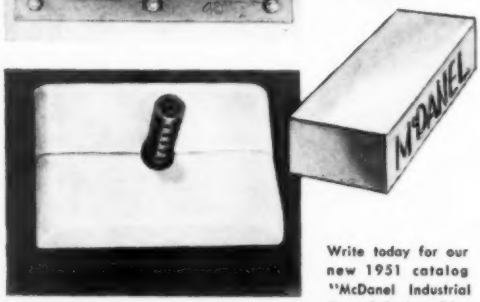
*Above: Photo shows paint dipping operation.*

*Right: Spray painting seats for toy tractors.*

*Below: Windows are shown leaving an infrared oven.*





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# That Last Look

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Elsewhere in the plant, severe machine testing has already satisfied other McDanel craftsmen that *no inner flaw* exists in the porcelains to be shipped.

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Yet, in their pride and skill, McDanel packers are often observed to "slip in that last look" at the pieces going into box and bag. Technically unnecessary, but —

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# Phosphate base glasses as enamels for aluminum and its alloys

Part 1

*by J. W. Donahey, G. J. Morris* AND *B. J. Sweo*

ABSTRACT

LEAD-FREE enamels for aluminum and its alloys have been developed which display good adherence and excellent surface texture. These enamels can be formulated in a wide range of colors, and metal pretreatment is simplified. The enamel is workable with a wide range of alloys.

Cover coat compositions possess P.E.I. Class A acid resistance and good hardness. The enamels are satisfactory for all indoor applications, although initial weathering tests indicate that improvement in weatherability is desirable in cases of continued outdoor exposure.

The enamels are essentially alkali alumina-borophosphate glasses, the ground coat containing as an essential constituent copper oxide. Through incorporation of lithium oxide in amounts up to 3.5%, the firing temperature is kept below the maximum which the metal can tolerate without deformation or alteration of metallurgical properties. Ground and cover coat compositions may be matured at or below 1000° F. in from three to five minutes.

THE enameling of aluminum and its alloys has been a subject of increasing interest to ceramists within the last decade.

Although patents relating to aluminum enamels date back as far as 1917[1], it has not been until comparatively recently that the enameling of aluminum has been carried out on any appreciable commercial scale. To achieve chemical durabilty along with low fusion temperature, presently available aluminum enamels contain relatively large quantities of lead oxide[2]. These enamels are usually alkali lead titania-silicates, which can be matured at or below 1000° F.

While the lead-bearing enamels possess a number of desirable properties, they present certain disadvantages which distinctly limit their use:

(1) The presence of lead, with the attendant industrial hazard, is undesirable.

(2) Recommended metal preparation, preparatory to the use of lead enamels, is undesirably complicated and laborious.[3]

(3) The number of alloys which can be satisfactorily enameled with existing commercial enamels is limited.

(4) Stability of enamel colors varies considerably, according to the colorant employed. To obviate this difficulty, a number of frits must be employed, each of which is suitable for certain colorants only[4].

The formulation of an aluminum enamel free from lead poses the problem of the choice of a glass system. Previous attempts to develop such enamels were based on the use of silicate glasses, generally with boric oxide and high alkali content. Such compositions frequently failed to mature at or below 1000° F., or else possessed such limited chemical resistivity that the action of water alone was sufficient to cause complete deterioration.

On the other hand, phosphate-base-glasses had not, apparently, been considered as possible base compositions for aluminum enamels. The low melting temperatures of phosphate glasses make them a particularly attractive choice, and, when alumina is employed, good chemical resistivity can be obtained[5].

Low temperature phosphate-base glasses have been the subject of study of Kriedl and Weyl[6], Grimm and Huppert[7], Stanworth[8], Kautz[9], and others [10]. Compositions reported by these authors indicate that, while low melting, the glasses are not suitable for 1000°F. application.

The first object of this investigation was, therefore, to determine those ranges of compositions in which the desired low melting properties might be obtained, along with at least a fair degree of chemical resistivity. The inclusion of lithia in the base composition was considered desirable since previous work[11] had indicated that $Li_2O$ lowers fusion temperatures and extends the range of glass formation of phosphate systems. It is also known that lithia, when substituted for other alkali on a molar basis, increases chemical resistivity[12].

## Experimental procedure

Experimental glasses were prepared by fusion in a gas-fired pot furnace under oxidizing conditions. Batches were formulated so as to yield 100 gm., 2000 gm., and 125 pounds of glass. Although some dif-

*This article is based on a cooperative experimental program carried out over the past several years by the research staffs of Foote Mineral Company, and Ferro Corporation.

ficulty was experienced initially with crucible erosion, it was found that the glasses could be melted satisfactorily in fire-clay crucibles provided the smelting temperature did not exceed 1800°F.

Fusibility was determined by the fusion flow test of Kinzie[13], cylindrical pellets .40" high by .35" in diameter being prepared by pressing with an hydraulic laboratory press in a suitable mold. Pellets were placed on a 4" x 6" steel plate, on which a commercial ground coat had been applied. After introduction into a temperature controlled electric kiln, the plate remained in the horizontal position on the firing rack for 2 minutes, then was lowered to the vertical position for 2 minutes. The distance of flow (in mm.) was then recorded.

The resistance of glass compositions to the leaching action of water was measured through the use of a conductivity cell and a pH meter. The conductivity cell employed measures directly in ohms the electrical resistance of solutions within the range of 0.2 to 250,000 ohms. Specimens of glass were ground to —200 mesh +325 mesh. Ten gram specimens were stirred into 100 cc of distilled water and allowed to stand for 3 days. In the initial work the electrical resistance and pH of the leach water was measured periodically, to determine the effect of time upon leaching action.

The values obtained with the conductivity cell are not quantitative, since in no case was the actual chemical composition of the solution determined. However, it does afford an excellent means of checking the resistance to water attack of glasses of widely varying durability, since the electrical resistance of the solution is determined by the total amount of all ions present. With the additional information provided by pH readings, a fair picture of the type of attack involved is obtained.

**Editor's Note:**

**The editors of *finish* have been endeavoring to keep its readers informed on important new developments in the field of enamels for aluminum.**

**This two-part article, containing many new and interesting ideas on the subject, is based on a cooperative experimental program carried out over the past several years by the research staffs of Foote Mineral Company, and Ferro Corporation. Mr. Donahey is with Foote Mineral, and Mr. Morris and Mr. Sweo are with Ferro.**

**Readers will recall the article "Vitreous Enamels for Aluminum," January and February, 1949, *finish*, which contained the first comprehensive official release of technical data on the subject.**

Acid resistance was checked by the standard P.E.I. test using cold 10% citric acid.

Adherence data was obtained using the P.E.I. Adherence Meter[16]. The enamelled sheet was impacted at 2000 lbs./sq. in. using a standard die. All loosely adhering enamel was removed and the adherence reading was obtained. An impact showing bare metal over this entire area gave the maximum reading of 169, and any value less than this amount indicated an increasing amount of enamel left adhering on the metal. Thus any value less than 30 would mean good to excellent adherence.

### Preliminary determination of areas of probable glass formation

Since the presence of only one alkali limits the field of glass formation, preliminary work utilized equimolar proportions of $Li_2O$ and $Na_2O$ as the $R_2O$ constituents. Exploratory trials indicated that the presence of both $Al_2O_3$ and $B_2O_3$ would be desirable, since the former is apparently necessary for chemical durability, while the latter contributes to low fusion temperature and extends the field of glass formation.

The promising compositional areas for alkali phosphate glasses, as determined by these explorations, can be defined by the formula:

$$.50\ Na_2O.\ x\ Al_2O_3.\ z\ P_2O_5$$
$$.50\ Li_2O.\ y\ B_2O_3$$

in which $(x + y + z)$ does not exceed about 2.00, x does not greatly exceed z, nor will $x + y$ greatly ex-

**Table 1**

**Effect of Variation of $Al_2O_3$, $B_2O_3$ and $P_2O_5$ on Fusibility and Resistance to Water Attack**

| Glass No. | Molar Compositions | | | | | Resistance (ohms) | | pH | | Fusion Flow |
|---|---|---|---|---|---|---|---|---|---|---|
| | $Li_2O$ | $Na_2O$ | $P_2O_5$ | $Al_2O_3$ | $B_2O_3$ | 1 hour | 3 days | 1 hour | 3 days | 1150°F. |
| A1 | .5 | .5 | .7 | .7 | .7 | 2700 | 400 | 8.0 | 8.0 | started |
| A-2 | .5 | .5 | 1.0 | .. | 1.0 | 200 | 50 | 6.2 | 5.4 | 26 |
| A-3 | .5 | .5 | 1.0 | .5 | .5 | 100 | 50 | 7.7 | 7.3 | fused |
| A-4 | .5 | .5 | 1.0 | .33 | .67 | 400 | 100 | 6.9 | 6.4 | started |
| A-5 | .5 | .5 | .7 | .6 | .7 | 3500 | 1000 | 8.4 | 8.3 | 29 |
| A-6 | .5 | .5 | .8 | .6 | .6 | 3100 | 1300 | 8.5 | 8.4 | 27 |
| A-7 | .5 | .5 | .7 | .6 | .6 | 2800 | 1250 | 7.9 | 8.1 | 29 |
| A-8 | .5 | .5 | .7 | .7 | .5 | 7750 | 2100 | 8.4 | 8.0 | 26 |
| A-9 | .5 | .5 | .8 | .6 | .5 | 7100 | 2400 | 8.5 | 7.8 | 22 |
| A-10 | .5 | .5 | .7 | .5 | .6 | 2500 | 600 | 8.3 | 8.2 | 26 |
| A-11 | .5 | .5 | .6 | .6 | .6 | 3600 | 1100 | 8.5 | 8.0 | 32 |
| A-12 | .5 | .5 | .7 | .6 | .5 | 4300 | 1650 | 8.4 | 8.1 | 33 |
| A-13 | .5 | .5 | .7 | .7 | .4 | 7150 | 2000 | 8.3 | 7.9 | 33 |
| A-14 | .5 | .5 | .7 | .5 | .5 | 5350 | 1200 | 8.4 | 7.8 | 21 |
| A-15 | .5 | .5 | .7 | .6 | .4 | 4400 | 1700 | 8.5 | 7.9 | 26 |
| A-16 | .5 | .5 | .75 | .. | .75 | 50 | 50 | 6.1 | 5.7 | 89 |
| A-17 | .5 | .5 | .5 | .5 | .5 | 1250 | 400 | 8.7 | 8.7 | 29 |
| A-18 | .5 | .5 | .7 | .5 | .3 | 3200 | 750 | 8.3 | 8.3 | 34 |
| A-19 | .5 | .5 | .75 | .5 | .25 | 4600 | 1450 | 8.1 | 7.9 | started |
| A-20 | .5 | .5 | .7 | .4 | .3 | 2200 | 300 | 8.0 | 8.0 | 19 |
| A-21 | .5 | .5 | .7 | .4 | .2 | 2600 | 250 | 8.1 | 8.0 | 41 |
| A-22 | .5 | .5 | .7 | .3 | .2 | 2650 | 250 | 8.1 | 7.7 | 64 |

ceed 2z. As with other glasses, the oxygen ratio should stay within normal limits; that is, within the range 2.0 — 2.5, with preferred ratios at about 2.3.

It should be emphasized, however, that these ratios do not define the entire range of glass formation. Resistant phosphate glasses may be free of $Al_2O_3$, $B_2O_3$ or both if suitable $R_2O$ and RO constituents are employed. Moreover there exists a considerable area of glass formation on the high $B_2O_3$ side, but these glasses are to be considered more accurately as borate, not phosphate glasses, and were eliminated from consideration.

### Effect of variations in $Al_2O_3$, $B_2O_3$ and $P_2O_5$

Employing the above general formula, a series of glasses was investigated in which the three network forming oxides $Al_2O_3$, $B_2O_3$ and $P_2O_5$* were varied. The results are given in Table I.

The effect of variations in $Al_2O_3$, $B_2O_3$ and $P_2O_5$ on fusibility and resistance to water attack is shown in Table I. Comparison data for commercial enamels are given in Table II. These results indicate that the compositions are not very resistant to attack.

In general, it is to be noted that chemical resistivity appears to be strongly dependent on the $Al_2O_3$ and $B_2O_3$ content, showing a pronounced increase as the former replaces the latter. This is shown also in Figure I.

*The assignment of $Al_2O_3$ as strictly a glass network former may be questioned. Kreidl and Weyl[14] support the view that $Al_2O_3$ so functions in phosphate glasses, although there is evidence that this oxide may serve both as a network former and modifier in the same glass, depending on compositions.

**Table II**

**Comparison Data for Commercial Enamels**

| Enamel | Resistance (ohms) 1 hour | Resistance (ohms) 3 days | pH 1 hour | pH 3 days | Acid Resistance | Fusion Flow at 1150°F. |
|---|---|---|---|---|---|---|
| A | 16,000 | 9050 | 8.2 | 7.9 | AA | None |
| B | 8,015 | 4580 | 8.0 | 8.0 | B | None |
| C | 3,500 | 580 | 9.2 | 9.6 | None | None |

**Table III**

**The Effect of Changes in the Alkali to ($R_2O_3$+$R_2O_5$) Ratios**

| Glass No. | D-1 | C-2 | C-3 | C-4 | C-5 |
|---|---|---|---|---|---|
| Ratio | 1/1 | 1/1.25 | 1/1.5 | 1/1.75 | 1/2 |
| $Al_2O_3$ | .333 | .417 | .500 | .583 | .667 |
| $B_2O_3$ | .200 | .250 | .300 | .350 | .400 |
| $P_2O_5$ | .467 | .583 | .700 | .817 | .933 |
| Resistance (3 days) | 178 | 450 | 1120 | 2550 | 450 |
| Fusion Flow at 1050°F. | 35.0 | 45.0 | 40.0 | 21.0 | started |

### Effect of alkali variations on base enamels

The effect of varying the three alkalis upon fusibility and resistance to water attack was studied in series B. This data is given in Figure 2. The top figure is fusion flow at 1050°F., the bottom figure is electrical resistance of leach solution.

No advantage in fusibility was gained through incorporation of $K_2O$, while the durability of the glass was affected adversely. The best ratio of

**Table IV**

**Reaction of Glass D-2 with Aluminum Metal (1200°F.)**

| Batch | How quenched | Density of glass | Density after reaction | Calculated voids |
|---|---|---|---|---|
| Hydrates used | Air | 2.56 | 1.58 | 38.3 |
| | Water | | 1.12 | 56.1 |
| $NH_4$+and hydrates | Air | 2.56 | 1.41 | 44.9 |
| | Water | | .73 | 71.5 |
| No hydrates or Ammonia | Air | 2.56 | 1.60 | 37.5 |
| | Water | | 1.84 | 28.2 |

**Table V**

**Effect of Various Reducible and non-reducible oxides upon boiling of Enamel Compositions**

| Glass No. | MxO added as: | Color | Reaction | Appearance |
|---|---|---|---|---|
| E-1 | PbO —$Pb_3O_4$ | White | None | Metal at interface. |
| E-2 | $Cu_2O$—CuO | Blue-Green | None | Metal at interface. |
| E-3 | $Cu_2O$—$Cu_2O$ | Red-Brown | None | Metallic copper distributed throughout, CuO. |
| E-4 | MnO—$MnO_2$ | Purple | Moderate | Small bubbles throughout. |
| E-5 | NiO —NiO | Brown | None | Metal at interface. |
| E-6 | NiO —$Ni_2O_3$ | Brown | None | Metal at interface. |
| E-7 | CoO —$CO_2O_3$ | Blue | None | Metal at interface. |
| E-8 | ZnO —ZnO | None | Violent | Large bubbles throughout metal interface. |
| E-9 | CdO —CdO | None | None | Metal at interface. |
| E-10 | FeO —$Fe_2O_3$ | Brown | None | Metallic iron distributed throughout and at surface. |
| E-11 | BiO —$Bi_2O_3$ | None | None | Metal at interface. |

**Table VI**

| Mols CuO added | | 0 | 0.03 | 0.05 | 0.10 | 0.15 | 0.20 |
|---|---|---|---|---|---|---|---|
| Reactivity (1/D) | (950°F. | 2.3 | 1.6 | 2.00 | 0.5 | 0.4 | 0.4 |
| | (1000°F. | 2.7 | 1.7 | 2.0 | 1.2 | 0.4 | 0.4 |
| | (1050°F. | 4.6 | 2.0 | 2.1 | 1.7 | 0.6 | 0.4 |
| | (1100°F. | 4.9 | 2.2 | 2.0 | 1.8 | 0.5 | 0.4 |

*1/D=Reciprocal Density. A value of 0.4 for 1/D indicates no reaction.

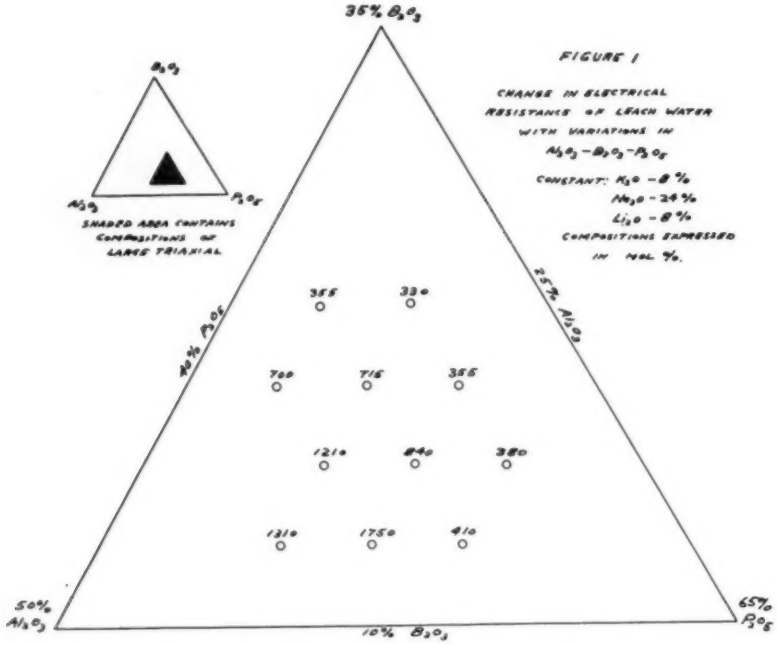
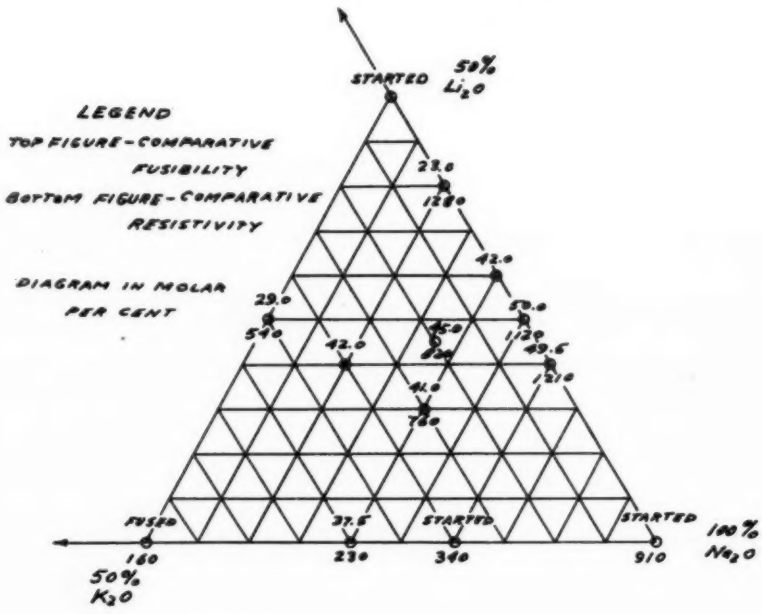



FIGURE 2




EFFECT OF VARIATIONS IN ALKALI OXIDES

alkali appeared to be .25 mols $Li_2O$, .75 mols $Na_2O$.

### Effect of ratio of $R_2O$ to $(R_2O_3+R_2O_5)$

With a constant alkali content of .25 $Li_2O$, .75 $Na_2O$ the ratio $R_2O$: $(R_2O_3 + R_2O_5)$ was varied. This data is shown in Table III.

### Further modifications of glass C-2

Glass C-2 was further modified by slightly increasing $P_2O_5$ at the expense of $B_2O_3$ and by the addition of fluorine. This glass was used as the basis for aluminum enamel compositions:

.25 $Li_2O$
.55 $Na_2O$ .417 $Al_2O_3$ .625 $P_2O_5$ (Glass No. D-2)
.20 $Na_2F_2$ .208 $B_2O_3$

This glass is not exceptionally resistant to water attack, with a resistance of 780 after 3 days of leaching. However, it fuses down readily at and below 1000°F.

### Reaction of glass with aluminum metal—effect of various oxides on boiling

When glass D-2 was applied to aluminum metal, severe boiling occurred at the interface and no adherence was obtained. The extreme reactivity of aluminum has the effect of magnifying a reaction not infrequently found in conventional on-steel enamels.

It is known that water (or OH ion) is retained to a considerable degree within the structure of certain glasses[15]. Under the reducing influence of metallic steel or aluminum, hydrogen is evolved at the enamel-metal interface. The hydrogen is, of course, obtained from hydrates in the batch or from the water resulting from combustion of furnace gases.

Batching procedures which eliminate hydrates or ammonia compounds from the batch will reduce, but not eliminate, the tendency to boil. This is shown in Table IV, which gives an indication of the amount of gas pockets resulting from fusing 100 parts of glass with 2 parts of aluminum metal at 1200°F.

Substituting .2 mols BaO for alkali

to Page 58 →

# Adapting spray finishing departments to defense production

*by John Rowe* • MANAGER, GOVERNMENT CONTRACT DIVISION, BINKS MFG. CO., CHICAGO

TWO problems about spray finishing usually pop into the mind of the manufacturer who is preparing for defense order production.

One is how to expand or adapt his spray finishing department to keep it abreast of stepped-up production, and do it at a sensible cost. The other is how he can apply the special finish or coating that defense orders usually call for.

Defense producers may save time in finding the answers by following the procedure outlined below. Many manufacturers do not know about the many services they can secure from finishing equipment suppliers to help them convert. By following this procedure, they can take full advantage of such services.

### Catching up on developments

Like most industrial techniques, spray painting has progressed since the end of World War II. For example, materials handling pumps are now widely used in the application of many types of finishes . . . present-day automatic finishing machines make much World War II equipment obsolete . . . and the spray guns of 1951 have many improvements over earlier models.

### Engineering service on equipment needs

The urge to be ingenious is especially strong in American industry. Often it has produced amazing results. But a defense producer can really come a cropper if he depends on a "shop genius" to design a machine to automatically finish shells, for example (as one did during the last war).

It's easier to ask a supplier for help. Frequently, the supplier knows how a similar problem has been solved—and thus knows how to save the defense producer time and money. He might, for instance, point out that guns with a 360 degree spray have been used very successfully for automatic finishing of the inside of a shell.

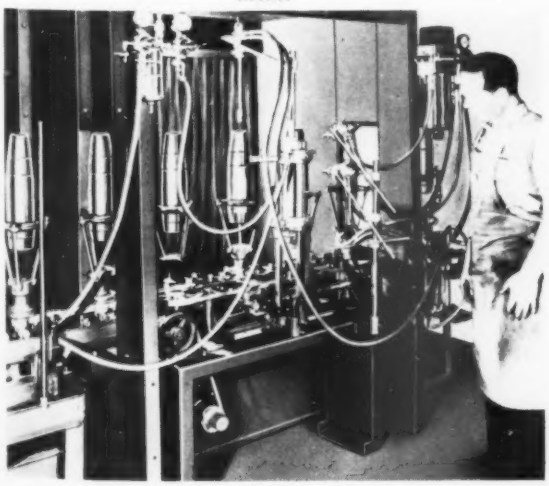
Most of the spray finishing equipment offered consists of items that have the engineering all done and the "bugs" all ironed out. Furthermore, back of the equipment are experienced finishing engineers who can help a manufacturer design special equipment, if needed.

So, since one who knows what was done before can speed up the solution of new problems, it's wise to look for help before you leap into spray finishing defense equipment.

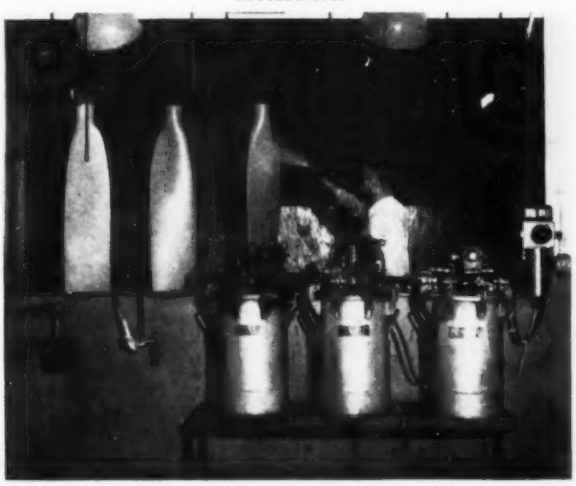
### Check into research facilities

If a defense producer is puzzled about how to apply a finish, he can

*Special machine designed to automatically coat the inside and outside of shells. Machine does not spray when an empty spindle passes the guns. This is an excellent example of complete systems that have been designed for spray finishing military equipment.*

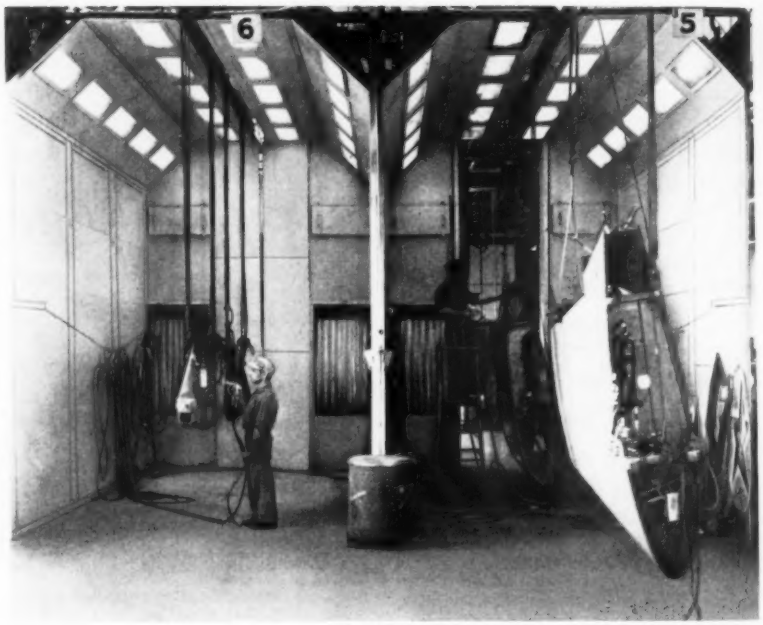


*Spray painting propeller blades at Norfolk Naval Air Station. Spray finishing equipment shown consists of items readily available on D.O.'s. Equipment includes spray guns, water-wash spray booth, pressure material tanks, oil and water extractor, and accessories.*



*Left: Paint circulating systems are practical for finishing departments using 50 gallons of paint or more per day. Major benefits from this type of materials handling are: absolute control of color and viscosity, fast switch from one color to another, reduced fire and explosion hazards, no time lost transporting paints to spray booths, no material tanks to block aisles, cleaner shops, and faster, more uniform production.*

*Right: Water-wash spray booths are especially designed for the products being finished. By opening doors in the rear of these booths, assemblies are conveyed through the booth to the next station without back-tracking. Lighting is arranged to avoid shadows.*




consult either the paint manufacturer or the finishing equipment manufacturer. Both will probably be glad to work with him. Usually there's no fee—it's done to create goodwill for the product.

**Review manpower training situation**

It may be possible to "farm out" at least part of your training to a supplier. Some suppliers offer training courses designed to acquaint foremen, department heads and others with the operation of a spray finishing department.

**The service angle**

During periods of emergency, parts and repairs for spray finishing systems may become a problem. Established suppliers usually have a jobber or a distributor near at hand. These men are ready to supply many needed parts. For major overhauling, most suppliers ask that spray guns or other finishing equipment be sent to their nearest sales and service office. Repairs are made promptly.

*Right: This automatic shell coating line puts spray finishing on a truly production line basis. Shells are placed manually on the spindles in the foreground. They are conveyed past a battery of automatic spray guns that coat them quickly and uniformly. Pre-heaters and driers are used to speed-up production.*

# f Advertising Results

## .... the story of PERMA-VIEW advertising in finish

## 100% increase in customers in One year

The first PERMA-VIEW ad appeared in July *1950* **finish**, immediately following the national stove convention at which Mills Engineering Company exhibited.

Our suggestion was for a page ad in July to be followed by *11* island half pages for a continuous *12* insertions.

Within *10* days following the appearance of the first ad on readers' desks the contract was increased to *12* full pages — based on actual results within the *10*-day period.

The accompanying letter tells the story of a *100%* increase in number of accounts served and inquiries from all over the world — all within the span of a single year's advertising.

Here is one of the rare instances where advertising results can be definitely measured . . . because . . . **finish is the only advertising medium used for promoting PERMA-VIEW windows.**

Here is POSITIVE PROOF that if you have the right material, equipment, component or service for the home appliance and allied metal products field . . . and present it properly in **finish** . . . the men who engineer and build the metal products plus those who purchase for and manage the producing plants will respond.

NOTE — Mills Engineering Company serves only one segment of **finish** readership — the producers of gas and electric ranges — **finish** circulation covers all appliance producers plus a broad group of other metal products manufacturers.

CCA NBP

**the only industrial trade publication completely blanketing the home appliance and allied metal products industries**

finish


## TWO TEMCO EXECUTIVES DIE IN AIRPLANE CRASH

Frank C. Drake, sales manager, and P. W. "Turk" Cullom, chief engineer, Temco, Inc., Nashville, Tenn., were among those killed in a recent airplane crash near Fort Collins, Colo.

Drake joined Temco in 1941 as a general accountant and was transferred to the sales department in 1943. In 1948 he was appointed sales manager and since had been supervising sales and distribution of Temco gas heating appliances to wholesalers serving retail outlets in the U. S., Canada, and Mexico.

Cullom joined Temco in 1940 and was appointed chief engineer in 1948. He had previously been with the engineering department of the NC & St L Railway.

## HART RESIGNS AS PRESIDENT OF MC CRAY REFRIGERATOR

Mrs. L. O. McCray, chairman of the board, McCray Refrigerator Co., has announced that J. W. Hart, president and director, resigned effective August 1. During his tenure of 44 years, Hart filled every executive office at McCray, except chairman of the board, serving as president since January, 1950. Hart stated that he had remained with the company for one year past his normal retirement age.

During World War II, he served for two years as president of the Commercial Refrigerator Manufacturers Association. He was also a member of the War Production Board, serving on the Refrigerator Equipment Industry Advisory Committee.

## A. O. SMITH NAMES TWO

A. O. Smith Corp., Milwaukee, has named F. F. Gregory, formerly public relations director, to the post of merchandising coordinator. A. P. Papke has been appointed manufacturing coordinator.

## NESCO NAMES MAUER TO HEAD MANUFACTURING

The appointment of Mel E. Mauer as director of manufacturing operations for Nesco, Inc., was announced by Emmett Gardner, executive vice president. Mauer will take charge of all manufacturing, purchasing and engineering.

Previous to joining Nesco, Mauer was with Hotpoint, Inc. where he was manager of manufacturing-engineering responsible for planning and expansion of manufacturing facilities, and earlier with Lockheed Aircraft Co., Burbank, Calif.

## PERFECTION VICE PRES. ANNOUNCES RETIREMENT

Chester A. Blackburn, vice president-manufacturing, Perfection Stove Co., has announced his retirement.

Blackburn joined Perfection in 1918 as foreman of the enameling department and later was assistant to the general superintendent of the firm's Ivanhoe Plant. After World War I, he became superintendent of that plant. In 1938 he was appointed works manager, in 1947 was elected director of manufacturing, and in 1948 vice president and director of manufacturing.

## AMA ELECTS BENJAMIN, SYLVANIA EXECUTIVES

The American Management Association recently announced the election of Hoyt P. Steele, vice president, Benjamin Electric Manufacturing Co., Des Plaines, Ill., as vice president of the Production Division. Steele is also a member of the board of governors of the National Electrical Manufacturers Association.

Don G. Mitchell, president, Sylvania Electric Products, Inc., New York, was reelected chairman of the Executive Committee. He is a former member of the NEMA board of governors.

## ILLUMINATING ENGINEERS ELECT. BEALS, MANWARING

The Illuminating Engineering Society, New York, recently elected A. H. Manwaring, executive vice president, Philadelphia Electrical & Manufacturing Co., Philadelphia, a vice president of the organization. Manwaring is also a member of the Technical Committee of the Street Lighting Section, the Major Appliance Division, and Electric Water Heater Section of the National Electrical Manufacturers Association.

G. W. Beals, chief engineer, The Miller Co., Meridan, Conn., was elected a director.

## LEWYT NAMES MFG. V. P.

Arnold M. Wolf has been appointed vice president in charge of manufacturing, The Lewyt Corporation, Brooklyn, according to A. M. Lewyt, president. Wolf has been works manager since 1942, and a manufacturing executive for 20 years.

## G-E DEFENSE PLANT TO BE 'APPLIANCE PARK'

General Electric Co. has announced construction of a $14,000,000 jet engine parts plant to be built on a 700-

acre site about eight miles from downtown Louisville, Ky. Upon completion of government work, the plant will be converted to an "Appliance Park" for the production of electric refrigerators, washing machines, garbage disposal units, and other appliances.

The project reportedly will include five factory buildings each 600 ft. by 1000 ft., a 300 ft. by 2000 ft. warehouse, an administration and laboratory building, railroad marshalling yards, and parking area to accommodate 4000 cars. At full production the plant is expected to employ 16,000 workers.

## GIBSON TO MAKE PARTS FOR ANTI-AIRCRAFT GUNS

Albert M. Gibson, vice president in charge of defense products, Gibson Refrigerator Co., has announced that the firm has received a sub-contract to manufacture essential parts for a new type anti-aircraft gun.

This anti-aircraft gun, which is said to be fully automatic sighting and firing, is the first of its type built for the Army Ordnance Corps. Gibson will make the front and rear bogies for the new gun.

The prime contractor is Standard Engineering Co., Elwood City, Pa., the ordnance division of Aetna Standard Engineering Co., Youngstown, Ohio.

## LINDEMANN & HOVERSON RECEIVES NAVY CONTRACT

A. J. Lindemann & Hoverson Co., Milwaukee, announced that it has received a Navy anti-aircraft ammunition contract amounting to approximately $1,300,000.

The firm reports that it is already producing tank tread pins on subcontract basis at the rate of $180,000 worth of pins per month, with defense work amounting to between 20 and 25% of total production.

## NORRIS-THERMADOR BUILDING $20 MILLION DEFENSE PLANT

Norris-Thermador Corporation, Los Angeles, has announced plans for the construction of a new plant at Riverbank, California, costing nearly $20,000,000, for the manufacture of cartridge cases from steel. In the past, cartridge cases have been made of brass, it was stated.

Norris-Thermador is the new name for Norris Stamping & Mfg. Co. and its wholly-owned subsidiary, Thermador Electric Mfg. Co. (*July, 1951*, finish).

## TRUCKING ASSN. CITATION TO SAFE TRANSIT COMMITTEE

At a recent meeting in Detroit, the National Freight Claim Council of

the American Trucking Associations, Inc. awarded a "Citation for Outstanding Contribution to Safe Transportation" to the National Safe Transit Committee. (*For a detailed report of this meeting, turn to Page 69.*)

## NEW WESTINGHOUSE PLANT FOR DEFENSE, APPLIANCES LATER

A half-mile long plant for the production of jet engine components will be built near Columbus, Ohio, according to J. H. Ashbaugh, vice president, Westinghouse Electric Corp.

"The Columbus plant will serve as a feeder plant for other Westinghouse jet plants; that is, it will manufacture jet engine component parts for Westinghouse-developed jets. After this demand for military production ceases, the Columbus plant will be converted to the manufacture of refrigerators," said Ashbaugh.

The new one-story building, the largest plant to be built by Westinghouse, will have 1,900,000 square feet of floor space.

## G-E NAMES BODDY, KELLEY TO RANGE DIV. POSTS

E. H. Boddy and G. F. Kelley have been appointed managers of engineering and manufacturing, respectively, of General Electric Co.'s range division, it was announced by J. R. Poteat, division manager.

Boddy has been with the firm since 1923 and for the past year has been in charge of home freezer engineering. Kelley joined G-E in 1929, and was assistant on manufacturing problems, when he was named to the post of manufacturing engineer of the major appliance department last November.

## DOMESTIC GAS RANGE SHIPMENTS AHEAD OF '50

Producers of domestic gas ranges shipped 172,700 units during May, bringing the total for the first five months of 1951 to 1,226,700. This was 9.5% higher than the 1,119,900 units shipped in the same period of 1950, according to GAMA.

## WATER HEATER SHIPMENTS RUNNING AHEAD OF '50

May shipments of automatic gas water heaters were 168,800, bringing the total for the first five months of 1951 to 1,040,200 units. This is 24.9% higher than the first five months of 1950. Latest available figures on electric storage water heaters cover first four months of 1951 with 372,200 units shipped compared with 274,400 for similar period in 1950. Four-month shipment of automatic gas water heaters for 1951 were 888,100 and 637,300 in 1950. Figures supplied by GAMA.

## JAMES MFG. STEPS UP DISHWASHER PRODUCTION

James Manufacturing Co., Independence, Kansas, had added 15,000 square feet of space to its plant in order to increase dishwasher production. The company has been producing dishwasher units at the rate

of 100 a day, according to Stanley Silber, sales manager. The recent plant addition is expected to increase production even further.

## JONES NAMED CHIEF EXEC. OFFICER FOR SERVEL

W. Paul Jones, president, Servel, Inc., was recently named chief executive officer of the firm, taking over duties of Louis Ruthenburg. Ruthenburg continues as chairman, but asked to be relieved of activities because of his many duties as president-elect of the Gas Appliance Manufacturers Association.

## HOTPOINT TO DEVOTE 20% OF '52 PRODUCTION TO DEFENSE

Approximately one-fifth of the total production of Hotpoint, Inc., will be devoted to defense work in 1952, according to James J. Nance, president.

Two new factories in Chicago that will provide a million square feet of manufacturing area are nearing completion, and this combined facility will be devoted to the production of jet engine components, said Nance. In addition, Hotpoint is building an additional plant in Milwaukee where turbo superchargers will be built.

***Battelle Institute's new laboratory**—which is under construction. This million-dollar laboratory results from increased demands for research services in behalf of the nation's defense effort, says Clyde Williams, director. The construction will be Battelle's fifth in the past decade. A three-story structure with two bays for pilot plant operations, the building will provide approximately 80,000 square feet of work area, housing 115 unit laboratories.*

## PERFECTION ABANDONS ACORN-ORIOLE RANGE LINES

Perfection Stove Company, Cleveland, has announced that it has discontinued manufacture of the Acorn-Oriole line of gas ranges which were added to the Perfection line in 1949 with the purchase of domestic range assets of Standard Gas Equipment Co.

L. Bushfield, general sales manager, said the decision was necessitated by materials shortages and by the diversion of certain available materials to current defense production.

***Show committee**—for 7th All-Industry Refrigeration and Air Conditioning Exposition, November 5-8, left to right: L. C. McKesson, Ansul Chemical, chairman; Geo. E. Mills, REMA show director; George Allen, Superior Valve; K. B. Thorndike, Detroit Lubricator.*

## PLANT MAINTENANCE SHOW IN PHILADELPHIA, JAN. 14-17

The next Plant Maintenance Show will be held at Convention Hall, Philadelphia, January 14-17, 1952, it has been announced by Clapp & Poliak, Inc., exposition management. Concurrently with the show will be the Plant Maintenance Conference.

## WILLARD MFG., ESTATE JOIN PORCELAIN ENAMEL INSTITUTE

Willard Manufacturing Co., Miamisburg, Ohio, and Estate Stove Co., Hamilton, Ohio, have joined the Porcelain Enamel Institute, it has been announced by the PEI Institute Development Committee.

## SHERWIN-WILLIAMS VOTES EXTRA DIVIDEND

Directors of The Sherwin-Williams Co., Cleveland, O., recently declared a 50 cent extra dividend in addition to the regular 75 cent quarterly payment on common stock. This brings disbursement for the fiscal year ending Aug. 31 to $3.50 from $3.00 the preceding year.

## WHAT DUTCH ENAMELWARE EXPERTS THINK OF U.S. PLANTS

*Netherlands experts in conference room of Ferro research building.*

Recently a team of Netherlands enamelware experts visited the United States under the technical assistance program of the Economic Cooperation Administration, to make a five-week study of American enamelware production. Six members of the team represented management, five were shop workers and foremen, and three were engineer-technicians.

The group, most of whom were from the holloware industry, cited the use of the continuous furnace as the greatest technical differences between their production and that in the U.S. In the Netherlands only the box-type furnace is used, they explained. In general, one continuous furnace will produce as much as six or eight box furnaces.

"In the plants that were similar to ours in size and in the products made", said the team leader, "we saw that productivity can be much higher than ours because of much better layout. We noticed that the plants' premises, right from the start, were built in accordance with a pre-arranged layout."

The contrast between "tradition" and "free experimentation" was a point of note in comparing the Dutch and U.S. manufacturing policies.

In addition to the potentials of a new work force of women, and the use of simplified designs and lighter-weight materials, team spokesmen listed in the area of "free experimentation" the following contrasting conditions:

1. Automatic pickling processes, which eliminate the old method of cleansing metal in a series of acid baths, and substitute spraying processes as the pieces are moved along on a conveyor.

2. Greater use of conveyors and materials handling devices of all types.

3. Adaptation of the shift system, to get a greater ratio of productivity to plant investment.

4. Development of a free, low-priced market in frit, which is now manufactured individually by each

large Netherlands enamelware plant, but is supplied to U.S. manufacturers by plants which specialize in frit-making research and quality control.

## ELECTROPLATERS '52 MEETING AT CHICAGO'S AMPHITHEATRE

The American Electroplaters Society has appointed Glassner & Associates, of Chicago, to manage and promote the Society's 3rd Industrial Finishing Exposition scheduled for June 16-20, 1952, at the International Amphitheatre, Chicago.

The Exposition will be held in conjunction with the organization's 39th annual convention at the Stevens Hotel. Previous Expositions have been sponsored by the Society in Detroit and Atlantic City.

Along with manufacturers of plating equipment and supplies, plating instruments, and paint and allied equipment, companies in related and service fields such as abrasives, masking tapes, chemicals, polishing and buffing, safety devices, materials handling apparatus, etc. are invited to exhibit at the Exposition.

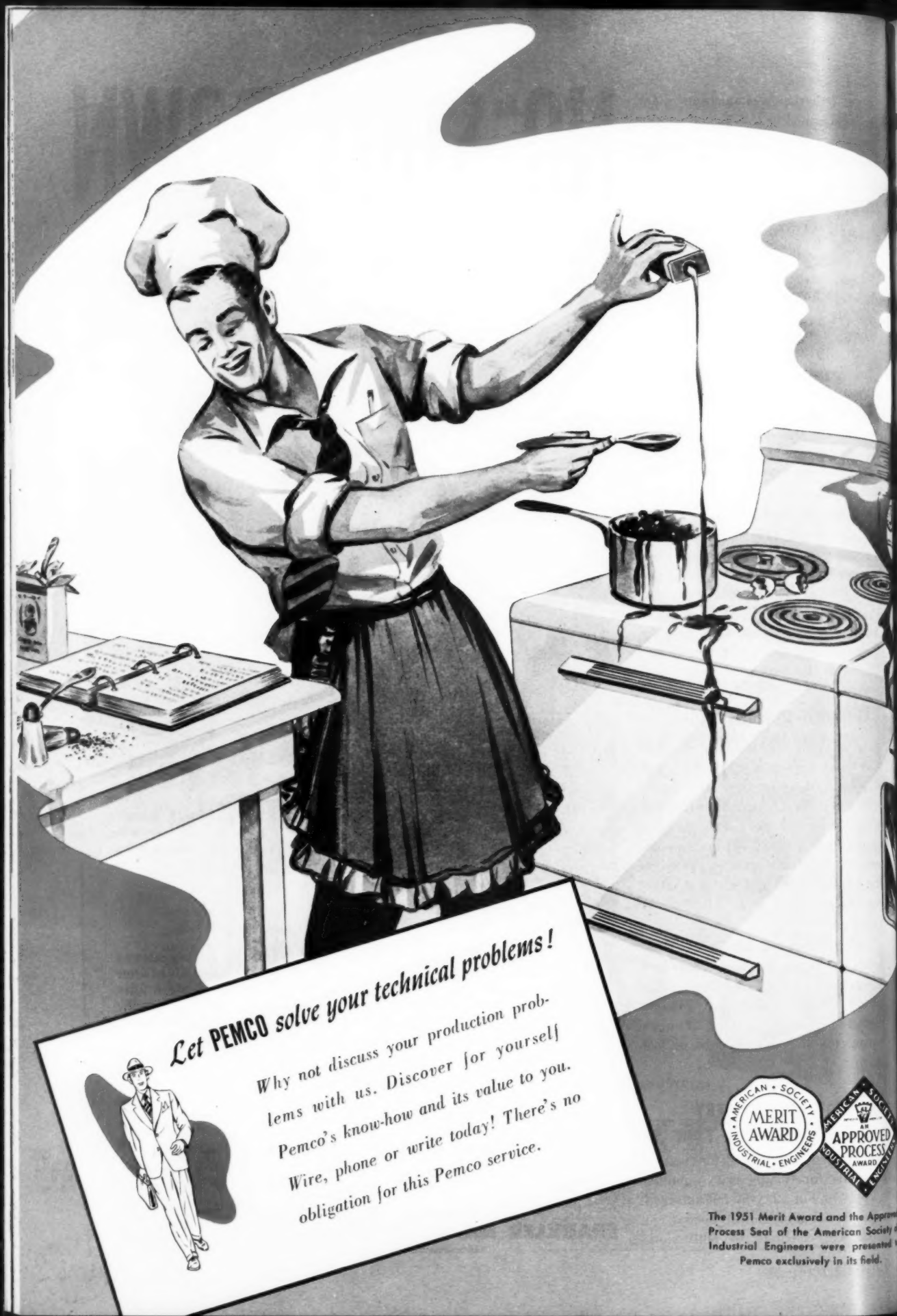
## GAS RANGE SHIPMENT FIGURES FOR FIRST HALF OF 1951

A press-time release from the Gas Appliance Manufacturers Association states that during the first half of 1951, shipments of domestic gas ranges totaled 1,315,400 units—compared to 1,336,900 units shipped during the same period of last year. During the month of June, 113,300 gas ranges were shipped.

Latest figures available on shipments of electric ranges cover the first five months of this year. During that period shipments totaled 744,000 units as compared with 732,200 units during the first five months of last year.

## ASTM 50TH ANNIVERSARY MEETING IN N. Y. IN '52

The American Society for Testing Materials, functioning as a committee since 1898, but officially incorporated as a national technical society in 1902, will celebrate its 50th anni-




The 1951 Merit Award and the Approved Process Seal of the American Society of Industrial Engineers were presented to Pemco exclusively in its field.

# Dad's Special Recipe"

There's one in practically every home: the man who steps confidently up to the kitchen range and whips up a culinary specialty while the little woman keeps her fingers crossed and breathes a silent prayer. Fortunately, the porcelain-enameled equipment can take it, whether stomachs are equal to the occasion or not. If your product calls for a finish that's *smooth as glass* and *hard as steel*—a lifetime finish that's burn-proof, resistant to scratches and acids, and easy to keep spotlessly clean—*that's porcelain enamel.* And for the finest in porcelain enamel, that means Pemco Products which offer you the economy of performance that uniformity assures. For high quality, for uniformity, for world-wide acceptance, *Pemco stands alone!*

*"After All, It's the Finish that Counts"*

**PEMCO CORPORATION**

**5601 EASTERN AVE., BALTIMORE 24, MARYLAND**

"THE WORLD'S FINEST" PORCELAIN ENAMEL FRITS • GLAZE FRITS • PORCELAIN ENAMEL COLORS • GLAZE STAINS • GLASS COLORS AND RELATED CERAMIC MATERIALS

*"Always Begin with a Good Finish"*

## PORCELAIN ENAMEL INSTITUTE COMPLETES DEFINITE CURTAIN WALL RESEARCH PLANS

The latest report from the Porcelain Enamel Institute Curtain Wall Research Committee outlines definite plans which will be followed in the development of a porcelain enameled curtain wall panel for the building industry. A research fund, approximately $50,000, has been contributed by members of the PEI and the general committee has now established a sub-committee which will analyze bids from engineering and research firms to be engaged for the program.

Release of the bid requirements plainly reveals the course to be followed in this research project. The scope of work includes evaluating existing curtain wall systems developed for aluminum and stainless steel as well as porcelain enameled metal. In addition, a design project will follow which is expected to produce designs for porcelain enameled curtain wall basic panel systems that will serve in coded areas requiring 1, 2 and 4-hour fire tests and in non-coded construction. Testing includes conducting necessary preliminary fire tests.

versary during its 1952 week-long annual meeting at the Hotel Statler, New York City, June 23-27. Throughout the meeting, the 10th Exhibit of Testing Apparatus and Related Equipment will be in progress.

## PENNSALT PRESIDENT AWARDS SCHOLARSHIP

Joseph W. Distel, of Wyndmoor, Pa., was awarded the first college scholarship provided for sons and daughters of employees of Pennsylvania Salt Manufacturing Co. by George B. Beitzel, company president. Selection was made on the basis of college entrance board examinations, scholastic record and citizenship.

In announcing the scholarship, the administering committee stated that there is no particular field of interest or specialty which the winner must be planning to follow.

***Reviewing new defense plant layout*** — *at Hotpoint, Inc., for production of jet engines, Pratt & Whitney officials from East Hartford, Conn., were guests of F. J. Walters (second from left), v.p. and defense coordinator. Left to right: G. W. Leserman, plant supt.; Walters; L. C. Mallet, ass't gen. mgr., and E. E. Champion, p.a. (both of Pratt & Whitney); E. E. McEwan, project coordinator-staff of defense; S. G. Bexson, defense mfg. engr. mgr.; B. E. Schroeder, v.p., mfg.; and J. F. Bunce, dir. of mfg. (Pratt & Whitney).* *(see news story on Page 42.)*

## STAMPING INDUSTRY TEAM VISITS ENGLAND

The Pressed Metal Institute reports that a stamping industry Productivity Team of executives, engineers, factory men and union representatives visited England (June 27 to July 28) under the sponsorship of the Economic Cooperation Administration. This is reported to be the first American team from the metal working industries.

Two years ago a similar British team visited this country, and the Pressed Metal Institute was instrumental in bringing them here and in arranging for this current return visit, according to Orrin B. Werntz, PMI managing director.

***Stressing the nation's need for scrap*** — *representatives of the steel industry and the government met recently in in Washington to put more effort in the nation-wide iron and steel scrap recovery program to avoid a possible lag in new steel production. Among those attending the meeting were, left to right: sitting — Fillip F. Aylesworth, special ass't to Sec. of Dept. of Agriculture for mobilization programs; Edward K. Moss, NPA public information director, who presided at meeting; L. D. Greene, American Iron & Steel Institute; and Edward W. Greb, acting director, NPA Salvage Division; Standing — W. W. McMillen, National Malleable & Steel Casting Co.; Henry P. Fowler, U.S. Chamber of Commerce; Herman Moskowitz, Schiavone-Bonomo Corp., and vice chairman of Mobilization Committee for Iron and Steel Scrap; F. H. Fanhelder, Steel Founders Society of America; W. Thomas Hoyt, consultant, NPA Salvage Division; F. Kermit Donaldson, Steel Founders Society of America; Chas. M. Brooks, NPA Steel Division; Robert Mossman, Jones & Laughlin Steel Co., and coordinator of Advertising Council's Iron and Steel Advertising Campaign; Frederick A. Keller, Chirurg Advertising Agency; S. J. Swanson, Institute of Scrap Iron and Steel; John Doxsey, American Steel Warehouse Assn.; and C. C. Winter, Farm Equipment Institute.*

## NEW COWLES SALES TERRITORY

In order to cover more completely the expanding market in the metal cleaner field, Cowles Chemical Company, Cleveland, Ohio announced that Robert H. Campbell was appointed Cowles technical man for the Metal Cleaner Department in its new sales territory comprising southern Illinois and St. Louis, Missouri.

He attended the University of Illinois and Rockford College, specializing in chemistry. Following college he worked for a number of years at National Lock Co., first in the plating laboratory, and then as assistant foreman on the plating line.

## ELECTROCHEMICAL SOCIETY TO HOLD 100TH CONVENTION

Detroit will be host to the autumn national convention of the Electrochemical Society, October 10, 11 and 12. This will be the Society's 100th meeting. Convention headquarters will be at Hotel Statler.



The technical program will to a major extent treat of the electrolytic deposition phase of electrochemistry.

## ZENER TO WESTINGHOUSE RESEARCH POST

The appointment of Dr. Clarence Zener as an associate director of the Westinghouse Research Laboratories, Pittsburgh, Pa., was announced by Dr. J. A. Hutcheson, vice president and director of research. He will serve also as acting manager of the solid state physics and magnetics department of the Research Laboratories.

Formerly professor in the Institute of Metals and the Department of Physics at the University of Chicago, Dr. Zener's three-part article published early this year proposed an entirely new explanation for the causes of ferro-magnetism. It has caused widespread discussion among scientists both here and abroad.

## FREEDOMS FOUNDATION AWARD TO GRAYSON CONTROLS

The Freedoms Foundation First Place Award for 1950 Company Employee Publications was presented to Joe McMillan, editor of the "Relief Valve," published by the Grayson Controls Division, Robertshaw Fulton Controls Company, Lynwood, California, at the 1950 Freedoms Foundation ceremony held at Valley Forge. The awards consisted of a medal and a $1500 check to the company, plus an honor medal to the Editor.

## MAYTNIER TO HEAD FERRO SUPPLY SALES

David M. Maytnier has been named vice president in charge of sales of the Ferro Enamel Supply Co., an appointment coincident to a long range expansion program, it was announced today by R. A. Weaver, board chairman of Ferro Corporation, Cleveland. The expansion involves two Ferro subsidiaries — Ferro Enamel Supply Co., Kirkland, Illinois, and Tuttle & Kift, Inc., Chicago.

Effective immediately Ferro Enamel Supply will have its own sales

department, headed by Maytnier. The concern had been operating under the direction of Tuttle & Kift in the manufacture of electric heating elements and controls.

## VETERAN FERRO SALES EXECUTIVE RETIRES

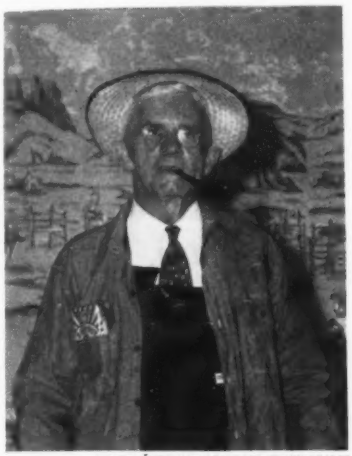


PHOTO COURTESY CLEVELAND PLAIN DEALER

Clarence B. Parkhill, sales manager of the Michigan division of Ferro Corporation, retired recently after being in the enamel business since 1907.

At a recent dinner, held at the Cleveland Athletic Club and attended by 80 Ferro executives, he was presented with some farming implements which he took back to his two-acre farm near Coshocton, O.

## NEW ROBERTSHAW RESEARCH LABORATORY COMPLETED

The West Coast Research and Development Laboratory of the Robertshaw-Fulton Controls Company has moved its equipment to the new laboratory building recently completed near the Los Angeles International Airport. H. W. Geyer is director of the new laboratory.

The initial building, containing over 12,000 square feet, is of modern fire-proof construction. Located on an acre of ground, the current facilities are so arranged as to permit future expansion to double the present floor area.

The laboratory is specially equipped for basic research, as well as the development of all types of controls and devices.

A modern test kitchen permits installation and operation of various domestic appliances, together with their accessories, under conditions duplicating actual use in the home.

## TOTH JOINS HOMMEL STAFF

The O. Hommel Company, Pittsburgh, manufacturers of products for the enamel and pottery industry, has announced the appointment of Joseph W. Toth to its research department.

Toth received his chemical education at Gannon College in Erie, Penna. Following graduation he joined the Continental Rubber Company, also located at Erie. Toth will assume the duties of an analytical chemist in the Hommel plant laboratories.

## HEADS ALLOY CASTING INST.

Election of Warden F. Wilson, general sales manager, Lebanon Steel Foundry, Lebanon, Pa., as president of the Alloy Casting Institute.

## TINNERMAN WINS TWO ADVERTISING AWARDS

Two major industrial advertising awards have been won by Tinnerman Products Inc., Cleveland, manufacturers of the "Speed Nut" brand of fasteners.

William M. Buttriss, director of advertising and sales promotion for Tinnerman, said the company's 1950 campaign based on the Tinnerman Speed Nut Savings Stories, won first place in the Putman Award contest and one of the three places in the National Industrial Advertisers Association annual competition.

The prize-winning campaign consisted primarily of advertisements giving case histories of how many diversified manufacturers saved assembly time and money by using "Speed Nut" fasteners. Placed in leading business and industrial publications, the ads were supplemented by a sales booklet, unique salesmen's business cards, trade show exhibits, and direct mailings, all based on the same savings theme.

According to H. R. Russell, general sales manager, credit for the highly successful Tinnerman campaign goes chiefly to Buttriss, L. A. Schweizer, advertising manager, and R. W. Twiggs, account executive for Meldrum & Fewsmith Inc., advertising agency which handles Tinnerman Products, Inc. A clinching factor in the winning of the two awards, it was indicated, was the fact that Tinnerman more than doubled the sales increase established as its goal for 1950.



## TAPPAN ADDS NEW MODELS

The Tappan Stove Company has introduced two new models — two divided-top kitchen heater ranges.

The divided-top kitchen heater models are now in production. They are equipped with a blue flame 30,000 btu space heater with room thermostat. The burner is lighted automatically and has a 100 per cent safety shut-off valve.

Both models are built on a 36-inch chassis and have a one-piece welded body construction. The ranges are completely enameled, have one giant, two standard and one mighty-mite burners. The ranges have a 17-inch porcelain-lined oven and "Clean-quick smokeless broilers, with porcelain pan and slotted grid.

## FLETCHER JOINS STAFF OF ARTHUR D. LITTLE, INC.

Arthur D. Little, Inc., industrial research and engineering firm of Cambridge, Mass., has announced the addition to its staff of John Fletcher, specialist in the field of varnishes, synthetic resins and protective coatings.

Fletcher, a native of England, studied at the Pratt Institute in Brooklyn, N. Y., and was later associated with Rohm & Haas Company and The Glidden Company. Most recently he operated his own laboratory, the Elmwood Research Laboratories, in North Attleboro, Mass.

## NEW LOCATION FOR BINKS WASHINGTON OFFICE

Binks Manufacturing Co. announces that its Seattle, Wash., branch has moved to an independent office in a downtown location. The move is intended to provide better service for jobbers and customers in the Pacific Northwest. The address of Binks' new office and storeroom is 2120 Fourth Avenue, Seattle. James C. Level is sales engineer and manager of the new office.

## GLIDDEN EXPANDS CHEMICAL, PIGMENT DIV.

A new step in the Glidden Company's Chemical and Pigment Division expansion program was announced by Dwight P. Joyce, president.

Joyce disclosed that Glidden will consolidate all of its powdered metal operations on its 25-acre site at Hammond, Ind., and will increase its output of cuprous oxides, cupric oxides; lead, iron and copper powder, as well as its Brazing Compounds.

## AMERICAN WHEELABRATOR REORGANIZES SALES DEPT.

In a move designed to meet the growing use of its products, American Wheelabrator & Equipment Corp., Mishawaka, Indiana, has reorganized and expanded its sales staff at the executive level according to Otto A. Pfaff, president. The firm manufactures airless blast cleaning equipment used for preparing metal surfaces for coatings and for other cleaning applications. They also manufacture air blast equipment, dust and fume collectors and other products for the foundry and metal working industries.

Personnel changes and additions include John A. Silver, appointed director of sales; E. B. Rich, general sales manager; L. L. Andrus, vice president and executive head of the Dust and Fume Division; A. E. Lenhard, advertising and sales promotion manager, assumes new responsibilities; S. S. Deputy, sales manager, to work closely with Rich on special assignments.

# New Supplies and Equipment

### H-10. Portable electric oven with temperature to 800° F.

A new low-priced portable electric oven, called model HT, has been announced for processing at higher temperatures such as required for stress relief of springs and plated parts. This oven features extremely uniform temperature throughout. Construction permits the nesting of one oven on top of another.

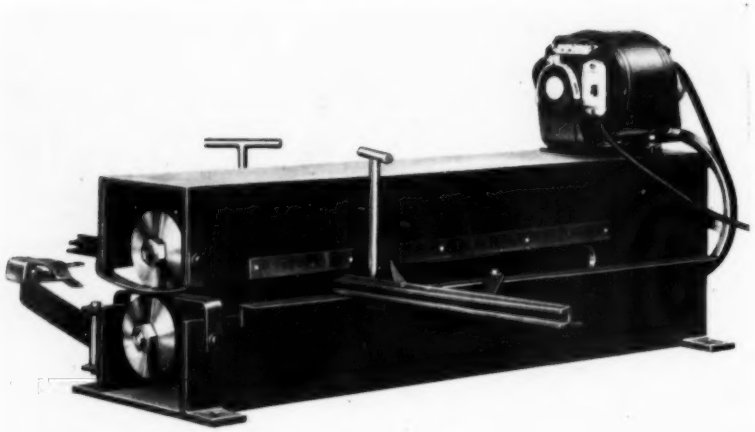
The ovens can be used in groups or banks and can be operated individually, or selected ovens in the group can be cut-out or heated at different temperatures. The temperature range is 100° to 800° F.

Construction is heavy gauge steel with glass fiber insulation. It will operate from any 110 volt outlet. No special wiring is required. 220 volt units are available. Drip pan and lower shelf are standard equipment.

**More Information**

**For more information on new supplies, equipment and literature reviewed here, fill out the order form on page 56, or write to us on your company stationery.**

### H-11. Portable metal slitting machine



Small shops with no room for a large shear and bigger shops with too much work for their heavy shears will be interested in this metal slitting machine which is said to reduce stand-by time, increase output, and cut operation costs substantially.

The machine handles up to 16 or 20 gauge mild steel — depending on the model selected. Some popular applications are on sheets or coils for flashings, flue pipe, skylight bars, strip stock for roll forming.

In ripping lighter gauges, i.e. aluminum, it is possible to cut two or more sheets at a time — doubling and tripling shop output. One man can cut up to 100 feet per minute of single thickness strip. The 27-inch throat depth permits cut to the center of a four-foot sheet — of any length.

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### H-12. Quick action solvent cleaner for metal surfaces

A new soak solvent, called "Dynakleen," is designed specifically for the quick removal of buffing and drawing compounds from knurled or fluted surfaces of all metals. The solvent will remove all types of soils including greases, oils, discolorations, etc., in less than a minute.

The solvent is said to require no heating or special tanks, and can be used in spray washing machines or applied by hand. It is a "safety" solvent which dries quickly and can be used over and over with only occasional filtration.

"Dynakleen" is said to be an ideal conditioner for preparing metal surfaces prior to plating, painting, bonderizing, galvanizing, etc.

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### H-13. Cleaning, phosphatizing powder for use in spray washers

A new cleaning and phosphatizing compound, to prepare steel and other metals for painting, is a white, granular, easy-to-handle, dustless powder used in spray washers prior to painting. The compound deposits a hard, dust-free, phosphate coating of metal which is said to prevent rusting and increase paint adherence.

Known as "Ion-Kote", the new compound cuts costs several ways: (1) used in 2- or 3-stage washers — fewer operations; (2) use only one material for cleaning and conditioning; (3) saves costs of rejects due to rusting before painting.

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### H-14. Spray painter handles small parts on a production basis

With a new automatic, compact spray painting machine, parts can be wet-painted, one color right after another. Spraying is from underneath, against the masks. Surplus spray falls away, is sucked off and exhausted out the back of the machine. Electro-formed metal masks, readily interchangeable, fit flush with the table of the machine and parts are loaded manually. Spraying is automatic, but length of spraying time and speed of loading cycle are controlled by dials. Rates of painting up to 3600 small pieces per hour are said to be possible.

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### H-15. Light-weight strap cutter

A new light-weight tool has been designed to cut flat steel strapping

up to ¾" x .035" with minimum effort. Among features of the simple construction is a band guide which

prevents straps from wedging sidewise between the blades. A flat lower blade permits easy insertion beneath tensioned straps on packaged products. Narrow span handles are curved to fit the grip of the operator. Measuring 9½ inches long, the tool weighs one pound.

### H-16. New slip handling unit

A new portable combination pump and sump unit is setting a new standard in millroom cleanliness for an Illinois porcelain enameling plant. The unit is used to transfer slips from grinding mills to overhead storage tanks. It consists of an electric-motor driven 1½" vertical shaft pump rigidly mounted on an all-metal tank cart with the impeller end suspended in a sump in the bottom of the cart. It is designed for a duty of 33 gpm of 1.9 specific gravity slip against a head of 50'. Both pump and sump are easy to flush and clean. The pump has no stuffing box, no submerged bearings and no exposed parts. The entire unit is mounted on large casters for easy-to-handle use by one operator.

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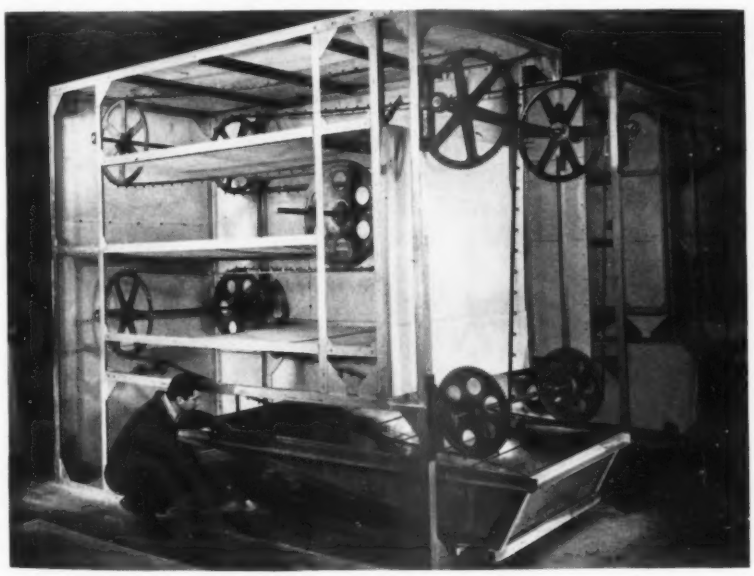
### H-17. Automatic dipping and drying machine



A new versatile type of automatic dipping and drying machine has been developed to coat small articles with any paint, lacquer, or varnish. It is said to produce tear-free, drain-free, and drip-free surfaces of uniform thicknesses. This is accomplished by means of automatically controlled extraction angles and rates from the dip tank, after which parts are dried in a forced draft controlled atmosphere. These factors are adjustable for viscosity of coating, size of piece, and production requirements. Positioning of the piece with respect to the carrying rack is pre-determined to eliminate any accumulation of lacquer in reverse curve horizontal sections. One operator is required for processing up to 450 rackfuls of work per hour.

The work carrying device is a length of square steel stock milled on opposite sides to accept "spring clips", the means of attaching individual pieces to the rack. These clips are readily removable for work change. Racks are loaded onto the conveyor of the dipping and drying machine, fastening to special chain conveyor attachments. These attachments are adjustable so that the angle of extraction from the coating bath can be varied. Special adjustable take-ups provide the means for accurately controlling the depth of immersion of the work into the dip tank, and also the angle and rate of extraction. Variable chain speeds to meet specific production requirements are produced by an external explosion-proof variable speed drive. As the chain progresses, the articles pass through the dipping tank, and then into the drying chamber, and back out to the loading position. The same operator who loads the racks, removes the racks of finished work.

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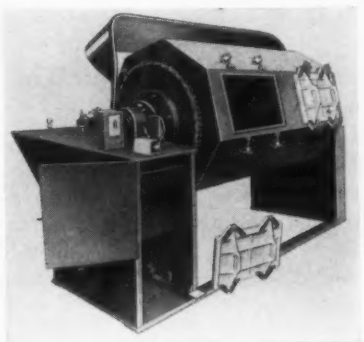
### H-18. Tumbling barrels with motor and operation mechanism enclosed



Made in both constant and variable speeds, a new line of tumbling barrels in compact design have both motor and operating mechanism totally enclosed. The only exposed parts are the controls and magnetic reversing starter, making them completely safe in operatiotn. A limit switch permits operation only when the hood is closed. Illustrated is a 7½ hp constant speed model that operates at 25 rpm. The variable speed 7½ hp model has speeds from 8 rpm slow speed to 25 rpm high speed, with an infinite range of speeds in between to meet operating conditions. Speed changes may be made while the barrel is in motion — no cumbersome changes in belts or pulleys. The foot operated hydraulic brake at floor level stops the barrel in any position — facilitates loading and unloading.

and prevents accidental dumping of loads.

### H-19. Bright dip for non-ferrous metals meets specifications

A "copper-brite" dip for brass, copper, bronze, nickle silver, phosphor bronze, berilliyum copper and most copper alloys is in accord with A/N, AF, ORD, and AEC specifications for bright dips on non-ferrous metals that require:

1. "After clear water rinse, shall leave no residue that will interfere with conductivity."
2. "Leaves non-ferrous metals in a passivated state, resistant to further oxidation."

The bright dip is completely safe to handle, special drains not required, non-toxic, non-fuming, requires no special ventilation, does not etch, and will not discolor solder.

### H-20. Emulsion cleaning process developed for all metals

A cleaning process for all metals, that utilizes emulsion cleaners of the W/O type (based on petroleum products) has been developed to replace hot chlorinated solvent degreasing. In effect, this system is the equivalent to spraying the work with solvent, while immersed in water, rather than in air.

### H-21. Non-pigmented, water soluble deep drawing compound

A new compound is blended for deep drawing a wide variety of grades of steel and thicknesses of steel of many types. It also draws aluminum efficiently. Non-pigmented and water soluble, the new compound is easily diluted, can be mixed to any consistency quickly. Any type of cleaner can be used to remove the compound.

There are several instances of complete elimination of scrap where the compound was used, and actual production tests indicate this new product is being used with great success "ahead of porcelain."

### H-22. New-type interior packing protects appliance finishes

A new type of protective interior packing is an answer to the problem of protecting the fine exterior finishes of home appliances, furniture, and other products with high inspection finishes. The packing consists of thick outer corrugated pads which absorb shock, and a special inner facing which protects the surface.

## Industrial literature

### 801. "Quick Facts on Handling"

A four-step approach to the job of obtaining improved handling efficiency is presented in "Quick Facts on Handling," a new illustrated brochure which supplements these concise suggestions with a complete presentation of one company's line of materials handling equipment.

### 802. Booklet on military packaging

A free booklet just released, entitled "Creped Cellulose Wadding for Military Packaging," serves as a guide for specification, procurement and use.

Subject heading in the booklet include: Military Specification; Bracing Protection of Large Equipment; Aircraft Wings — Control Surfaces; Instruments, Electrical, Aeronautical — Delicate Equipment — Tubes; Fixtures—Sub-Assemblies — Small Parts; Absorbent Packs—Liquids—Pharmaceuticals; Functions of Cellulose Wadding; and a bibliography on cushioning determination studies.

### 803. Quick reference list of metal protective and paint bonding chemicals and processes

A standard file size reference list covering metal protective and paint bonding chemicals and processes will be sent free to *finish* readers. The list includes materials for iron and steel, stainless steel, aluminum, brass, copper, and other materials and alloys.

### 805. Welding accessories bulletin

A new bulletin of arc welding accessories illustrates and describes the features and advantages of Cam-Lok cable connectors, electrode holders and terminal connections.

### 806. Booklet on packaging service for defense production

A large manufacturer of shipping containers has published a booklet entitled "Packaging Service for Government Prime and Sub-Contractors." The booklet tells how this container manufacturer is prepared to help metal products manufacturers package their defense products.

### 807. Folder on cut-wire shot for cleaning and peening

A new four-page folder describes the use of cut-wire shot for cleaning and peening. Well-illustrated with before and after-use photos, the folder describes economies and characteristics of cut-wire shot. A comparison table is included showing money saved by a large manufacturer through the use of this shot.

**FINISH**
**360 N. Michigan Ave.**
**Chicago 1, Illinois**

**Please forward to me at once information on the new supplies and equipment and new industrial literature as enumerated below:**

**No.**_____ **No.**_____ **No.**_____ **No.**_____

**No.**_____ **No.**_____ **No.**_____ **No.**_____

**Name** _____ **Title** _____

**Company** _____

**Company Address** _____

**City** _____ **Zone**____ **State** _____

## VITRO RESEARCH SPONSORSHIP

The Vitro Manufacturing Co., Pittsburgh, has announced the sponsorship of a number of cooperative research investigations in the field of physical and chemical technology relative to the development and manufacture of colors for the ceramic industries.

The institutions selected for these projects are Battelle Memorial Institute, Columbus, Ohio, and the Institute of Research, Lehigh University, Bethlehem, Pa. Both institutions have begun their investigations on certain specific projects outlined by the Vitro organization.

## YOUNGSTOWN WINS FREEDOM FOUNDATION AWARDS

Three gold medals and a $100 cash award were presented to The Youngstown Sheet and Tube Co. at a Freedoms Foundation ceremony recently. Two medals and the cash award were in recognition of outstanding work in publishing of the firm's house organ. The third medal was for the company's advertising program.

## NEW PATENT RESEARCH, EDUCATION FOUNDATION

A Patent Foundation for research and education in the fields of patent, trademark, copyright and the related systems of laws has been established under a Declaration of Trust at The George Washington University Law School, Washington, D.C., Dr. Cloyd H. Marvin, president of the University, announced.

## PEMCO NAMES AD AGENCY

W. Russell Greer, vice president, Pemco Corporation, Baltimore, manufacturers of porcelain enamel frits, porcelain enamel colors, and related ceramic materials, announced the appointment of Brindley-Roth, Inc., Detroit, as advertising, merchandising, marketing and public relations counsel effective August 1. Greer stated that trade magazines, direct mail, and merchandising promotion aids will be used.



## Phosphate base glasses as enamels.....

→ *from Page 34*

in the base glass increases chemical resistance of the glass but does not affect the tendency to boil, a water quenched sample producing 56.0% voids when subjected to the above test. No significant difference was noted when glasses were prepared in an electric kiln rather than a gas-fired pot furnace.

It appears reasonable to assume that the gas evolved is actually combined in the glass, in accordance with the observations of Weyl[11] concerning the ability of boric oxide, aluminum oxide and phosphorous oxide to retain monovalent anions within the glass structure (in this case, presumably $OH^-$).

The solution of this problem lies in the inclusion in the glass composi-

tion of oxides more easily reduced than water. In comparing heats of formations of various oxides it is seen that the oxides of copper, lead, cobalt, cadmium, bismuth, nickel and iron should all be reduced to the metallic state more easily than $H_2O$. Deposition of such metals at the interface should also serve to inhibit further reducing action by the aluminum metal.

Table IV shows the effect of various oxides incorporated at the expense of alkali into a glass of the general formula:

.20 $Li_2O$
.20 $Na_2F_2$
.40 $Na_2O$ .417 $Al_2O_3$ .625 $P_2O_5$
.20 MxO .208 $B_2O_3$

From a theoretical standpoint, the copper oxide should be most easily reduced, which, in fact, appears to be the case with these compositions. The most successful ground coats contain copper, while cobalt can also be used although adherence to aluminum is not as good. Lead might also be employed, but for its obvious disadvantages.

The effects of various additions of CuO on the reaction between the enamel and aluminum were studied by heating powdered enamel and aluminum at various temperatures in the firing range. Any reaction would be evidenced by the creation of a vesicular structure. The mass of this structure would be directly proportional to the amount of reaction occurring. Thus the reciprocal of the apparent density of this mass would be a direct measure of the amount of reaction. The results of this work are shown in Table VI; these indicate that the addition of 0.10 mols of CuO to the composition would reduce the reaction sufficiently to allow the enamel to be used as a ground coat, and an addition of 0.20 mols of CuO would prevent the reaction.


REFERENCES

1. U.S. Pat. No. 1,230,958 (June 26, 1917) "Ornamenting & Protecting Metal Surfaces", K. Warga; U.S. Pat. No. 1,346,475 (May 27, 1919) "Decorating Metal Surfaces", K. Warga; Swiss Pat. No. 79,967 (1919) "Enameling Aluminum"; Swiss Pat. No. 85,577 (1919) "Enameling Aluminum".
2. U.S. Pat. No. 2,467,114 (Apr. 12, 1949) "Vitreous Coatings for Light Metals", Alden J. Deyrup, assigned to E. I. duPont de Nemours & Co.; J. C. Bailey and Marjorie E. Whitaker, "Vitreous Enameling of Aluminum Alloys and Aluminum", Light Metals, March, 1949; Reta Farnham & J. F. McMahon, "Enameling Aluminum", Monthly Progress Report No. 129, Ceramic Research Dept., New York State College of Ceramics, Vol. XII, No. 3, March, 1947.
3. P. J. Carlisle, A. J. Deyrup & A. O. Short, "Vitreous Enamels for Aluminum", Finish 6 (1) 43, 68 (1949).
4. Ibid, Finish 6 (2) 33-34 (1949).
5. N. J. Kreidl & W. A. Weyl, "Phosphates in Ceramic Ware, IV Phosphate Glasses", J. Amer. Ceramic Soc., 24 (11) 372-78 (1941).
6. N. J. Kreidl & W. A. Weyl, "Development of Low-Melting Glasses on the Basis of Structural Considerations: I-IV" Glass Ind. 23 (9) 335-38, 357; (10) 348-86; 402-03; (11) 426-28, 441; (12) 465-67, 480 (1942).
7. U.S. Pat. No. 1,964,629 (June 26, 1934) "Vitreous Composition", H. G. Grimm & P. Huppert; U.S. Pat. No. 2,100,391 (Nov. 30, 1937) "Vitreous Compositions", H. G. Grimm and P. Huppert; U.S. Pat. No. 2,227,082 (Dec. 31, 1940) "Phosphate Glass", A. G. Grimm and P. Huppert.
8. U.S. Pat. No. 2,390,191 (Dec. 4, 1945) "Phosphate Glass", J. E. Stanworth; U.S. Pat. No. 2,441,853 (May 18, 1948) "Phosphate Glass", J. E. Stanworth.
9. K. Kautz, "Molybdenum in Enamels: IV, White Molybdenum Enamels", J. Am. Ceram. Soc., 28 (3) 82-89 (1945).
10. U.S. Pat. No. 2,436,825, "Superopaque Vitreous Enamels", H. D. Prior. British Pat. No. 498,049 (Jan. 3, 1939) "Phosphate Glass", G. W. Johnson. British Pat. No. 592,038 (Sept. 17, 1947) "Glass Composition and Articles Made Therewith", British Thompson-Houston Co., Ltd. W. J. Baldwin, "Superopaque Enamels of Low Silica Content", J. Am. Ceram. Soc., 31 (5) 115-22 (1948).
11. A. W. Bastress and W. A. Weyl, "Fields of Glass Formation: IV. The Effect of Lithium Oxide on Glass Formation in Alkali Phosphates", Glass Science Bull. IV, 134-139 (1946).
12. M. O. Lewis, "Effect of Lithia Substitution for Soda in Vitreous Enamel", J. Am. Ceram. Soc., 26 (3) 77-83 (1943).
13. C. J. Kinzie, "Method for Study of Relative Viscosity of Enamel Glasses" J. Am. Ceram. Soc., 15 (6) 357-60 (1932).
14. W. A. Weyl, "Colored Glasses", Part I, J. Soc. Glass Tech. 27, 165 (1943).
15. B. J. Sweo, "Correlation of Weather Resistance of Porcelain Enamels with Chemical Test Data", J. Am. Ceram. Soc. 32 (11) 356-59 (1949).
16. "Progress Report of P.E.I. Research Associate, Nat'l. Bur. of Stand." A. C. Francisco, Proceedings of 10th Annual P.E.I. Forum (1948).

# Summer homefurnishings market

## new products, buying activity and availability of appliances

REGISTRATIONS of buyers attending the Summer Homefurnishings Market in Chicago approximated 16,000, about a 12% drop from last summer's market. Selling and booking orders settled into a more competitive pattern than at any of the previous postwar markets, and industry leaders labelled the activity as "cautious and selective."

While market activity was slow, some manufacturers were reported as saying that buying actually exceeded their expectations. After last January's record buying spree in anticipation of materials shortages which did not develop, buyers came to the mid-year market with large inventories in their warehouses—in most lines.

High-volume manufacturers, aware of full stockrooms at the dealer level, dressed up their lines, and many of them, for the first time in years, revived their former aggressive selling and merchandising programs. Several large manufacturers introduced some new models, but it was up to the smaller companies to introduce some really-different products.

Manufacturers exhibiting at both The Merchandise Mart and the American Furniture Mart were unanimous in their opinion that materials will continue to be available, and that there will be adequate production. They were just as unanimous in their opinion that there will be no price reductions in the near future. In contrast to the January market with its quotas and allocations, practically all merchandise was available at the summer market. It was felt that production of major home appliances may be hit in the third and fourth quarters, the extent of cutbacks dependent upon steel availability.

### Good design exhibition

The "Good Design" exhibition at The Merchandise Mart featured some 150 homefurnishing items. The exhibit's display included a Frigidaire white electric range, a Chambers blue gas range, a Hotpoint sink-dishwasher combination, and a Kay-Way portable dishwasher. The exhibition is sponsored by the Museum of Modern Art (New York) and The Merchandise Mart.

### Built-in range units for standard kitchen cabinets

One new appliance shown at the summer market was Presteline's built-in electric range units which can be built into any standard kitchen cabinet at any height or position desired, and includes an oven compartment.

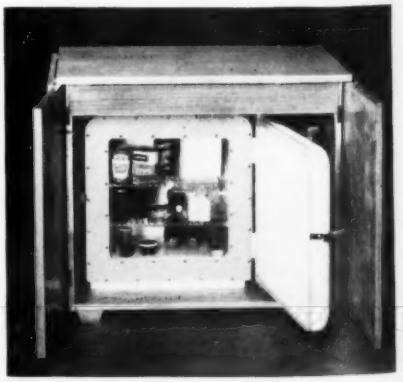
### Home freezer with work surface separate from lid

King Refrigerator Corp. showed a new line of farm and home freezers which are built to "go through any door." None of the models exceed 27¾" deep. A feature of one model in the new freezer line is a three-quarter lid which allows work surface space at one end of the unit.

### Complete kitchen unit only 27½ inches wide

General Air Conditioning Corp. showed a complete kitchen unit—only 27½ inches wide. It combines a refrigerator, storage drawer, a 12 x 16-inch sink, and a three-burner gas range in slightly more than 4 square feet of floor space. Other models

*Left: This complete kitchen unit, only 27½ inches wide, was displayed by General Air Conditioning.*



*Right: Console-type refrigerator-chest was introduced by Arthur S. Optner at the American Furniture Mart.*

provide three electric surface heating units. When the cover for the range is down, it provides a drainboard adjacent to the sink.

### Console-type cabinet encloses 2-cubic-foot refrigerator

A refrigerator with a 2-cubic-foot capacity, and enclosed in a console-type cabinet faced with bleached mahogany, was introduced by Arthur S. Optner. The unit has two ice cube trays. The console cabinet has additional space for canned goods, fruit, or dry storage.

### Portable air drier

Appliance Manufacturing Co. announced a new portable Duchess air drier for removing excess humidity from the air. The unit, which carries a 5-year factory warranty, will remove under high humidity conditions approximately 10 quarts of water from the air in 24 hours.

### Norge introduces washer with "wave action" agitator

Norge introduced the "Time-Line" automatic washing machine which provides action through a "wave action" agitator. The new models features three rinsing actions—two separate spray rinses and a "Tidal Wave" rinse during which the rinse water rinses over the clothes level, then goes through an agitated overflow, and then into a "deep-wave" rinse. To assure the removal of sand and grit, a ring of small openings have been included in the bottom of the tub through which grit is forced out during the rapid spin.

*Shown above is Presteline's new custom built-in range. The units are designed to fit standard kitchen cabinets. Oven can be installed at any height or location, and cooking elements may include two, four, six or more elements.*

### Meynell displays small ranges

Meynell Manufacturing Co., a new exhibitor at the market, introduced the "Honeymoon" electric range. The 20½"-wide range with a two-burner top was designed for apartments, trailers, tourist cabins, hunting lodges, game rooms, etc.

### Servel introduces line of electric refrigerators

Servel, Inc., nationally-known for its line of gas refrigerators, introduced several electric refrigerator models for the domestic market. It was stated that Servel's new electric refrigerator has no moving parts, enabling the company to give a 10-year warranty on the units. The electric models employ the same absorption principle as the firm's gas refrigerator except for an electric heating element in place of the gas flame.

### Portable exhaust fan for kitchen or living room

Welch Company offered a new streamlined fan which can be carried from room to room with ease. The fan can be placed in either sash

*to Page 62* →

*Left: One of Kalamazoo Stove's "Golden Jubilee" ranges. Both gas and electric ranges have full-width ovens in 30-inch range size. New models highlight the company's 50th anniversary.*

*Right: Gibson's 2-door, 2-temperature combination home freezer and refrigerator.*

or casement windows without bolting, drilling or tapping. Simple, interlocking attachments are supplied for easy fastening. The fan is easily reversed, thus can be used as a kitchen exhaust unit or as a cooling unit for the living room.

### Full-width oven enclosed in compact 30-inch size range

New 30-inch wide ranges, introduced by Kalamazoo Stove & Furnace Company, have full-width completely automatic ovens. Other features include a glass-bottom broiler for "Broiling-Over-Glass", glow-light glass panel with automatic oven control and minute-minders; and a golden-glass oven handle with cook chart dial. Both gas and electric models are identical in design, with four burners or heating elements in a divided top.

### Coolerator shows new freezer

As part of its expansion plan, Coolerator introduced a new freezer that provides more than 13 cubic feet of capacity in a 55-inch cabinet. The new unit will store some 450 pounds of frozen foods in a regular storage compartment and a special quick-freeze section.

### Gibson brings out 2-door freezer-refrigerator

A new line of 2-door combination refrigerator and home freezers was shown by Gibson Refrigerator Co. Each of the new models features separate freezer compartments, with the two independent doors providing for separate temperature controls with individual dials.


### Stiglitz features cold wall cabinet in gas heaters

Two new gas space heaters, featuring the cold wall safety cabinet, were shown by Stiglitz Furnace & Foundry for the first time at the summer market. Both heaters will take natural, manufactured or LP-gas. They are unvented, radiant, circulator type, providing the two-way heating effect of radiation and warm air circulation. The cold wall safety cabinet feature makes it possible to place one's hand on top of the unit while it is in operation.

### Gray & Dudley oil heater

Gray & Dudley showed an oil heater with a cost iron lining built to withstand excessive heat. The oil heater is said to be the only one of its kind. The company also showed its new line of down-draft oil burning circulators, and both gas and electric ranges with a glass oven door.

### More color in appliances

A gradual trend to color in home appliances continued. A few more manufacturers displayed appliances designed to fit in with kitchen color schemes. Yellow was the color featured this year. Women's Friend washers had yellow skirts and lids, with white trim; Presteline displayed a yellow refrigerator; and Conlon Bros. showed both yellow and green model White Way washing machines.

### Possibility of fall market given fresh impetus

The possibility of the industry reviving the fall market was given fresh impetus when the board of governors of the American Furniture Mart voted to conduct a survey of manufacturers, wholesalers, and dealers. It was indicated that if survey results favor it, the Fall Market would open on October 22. The last fall market was held before World War II.


August · 1951
safe transit
FROM ASSEMBLY LINE TO FINAL CUSTOMER

# safe transit

A monthly trade publication section devoted to improved packaging and shipping and materials handling practices in the home appliance and allied metal products field.

Plant experience information for all executives and plant men interested in the problem of packaging and shipping improvement and loss prevention.

Complete information on the National Safe Transit pre-shipment testing program for packaged finished products, and detailed progress reports of divisions and sub-committees of the National Safe Transit Committee.

## CONTENTS

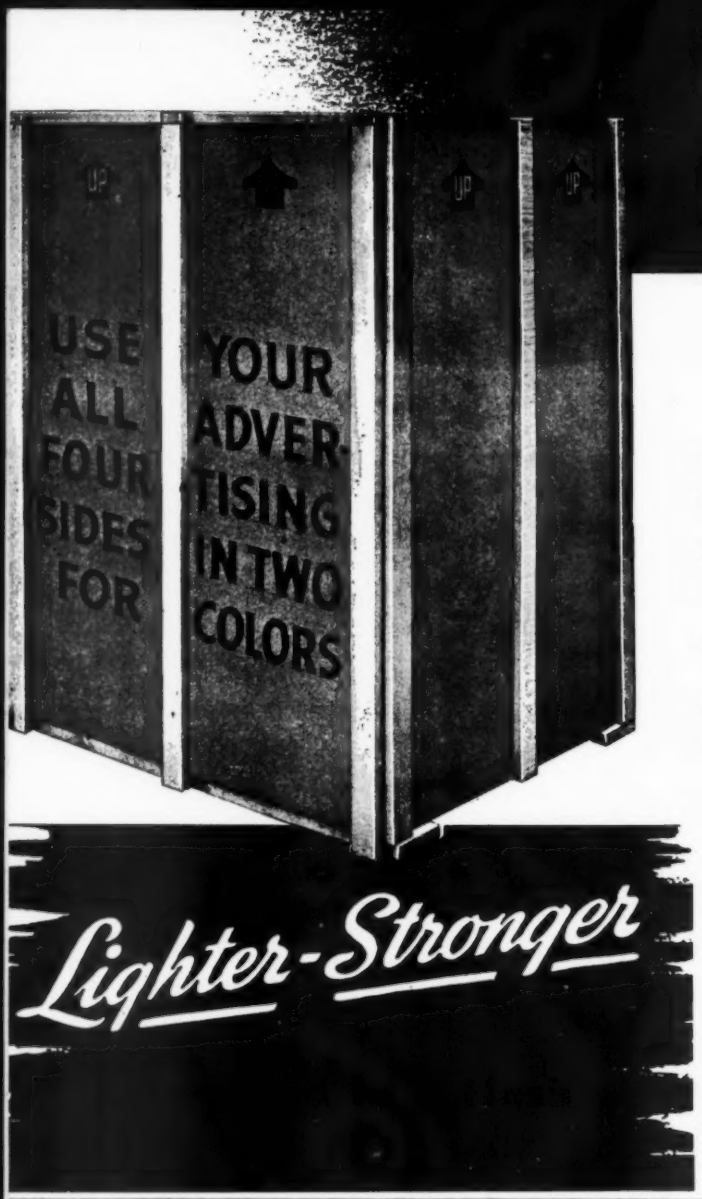




**Carousel conveyor**—*in Westinghouse Buffalo Works distributes motor frames, slot-cell insulation, stator coils, face insulation, and wedges to winding positions. Workers slide stators on and off 32-fpm carousel conveyor as needed. Stator carrier have rollers for easy transfer.*

**Sorting turntables in operation**—*at Frigidaire's Moraine City plant (story on Page 72). Workers are shown turning crated electric water heaters toward sloping conveyor leading to plant's truck dock.*

# The WATKINS CONTAINER




## The TRAVELING BILLBOARD

### Features

1. The container is a traveling billboard—2 color printing tells your product story on one or all the four sides of the container.

2. It is light in weight—weight saving up to several pounds can be made in practically every case.

3. It saves packing time—it reaches the user 75% assembled.

4. It saves storage space—completely collapsible, it saves shipping space in transit and storage space in the plant.

5. It has extra strength—superior to ordinary containers in product-carrying strength.

6. It resists "weave"—it will carry more top load and resist "weave" better than open-type crates.

---

**Watkins Containers save time in the shipping department; give better protection in transit. Major appliances and any other similar products that can be shipped in a wooden crate can be shipped better in this container. Weights up to 800 pounds are being shipped.**

## Some products that ship better in WATKINS containers

- Washing Machines
- Refrigerators
- Ironers
- Storage Water Tanks
- Steel Kitchen Cabinets
- Air Conditioners
- Unit Heaters
- Sinks
- Pumps
- Water Softeners
- Furniture
- Gas and Electric Ranges
- Oil Burners
- Caskets
- Stoves
- Radio and Television Sets

## These companies build WATKINS containers

| | |
|---|---|
| Cornell Wood Products Co., Hummel & Downing Division | 1514 E. Thomas Ave., Milwaukee, Wisconsin |
| Cozier Container Corp. | 446 E. 131st St., Cleveland, Ohio |
| Crate-Rite Mfg. Corp., Div. of Pacific Ports Ind. Inc. | 10901 Russet St., Oakland, California |
| Dura-Crates, Inc. | 940 E. Michigan St., Indianapolis, Indiana |
| General Box Co. | 500 N. Dearborn St., Chicago, Illinois, and 16th and Maple Sts., Louisville, Kentucky |
| Hemb & Martin Mfg. Co. | Watseka, Illinois |
| Illinois Box & Crate Co. | 811 Center St., Plainfield, Illinois |
| Kieckhefer Box & Lumber Co. | 1715 W. Canal St., Milwaukee, Wisconsin |
| Lane Container Corp. | 10212 Denton Rd., Dallas, Texas |
| Lewisburg Container Co. | 243 Singer St., Lewisburg, Ohio |
| Love Mfg. Inc. | 608 S. Commerce St., Wichita, Kansas |

— an inquiry to any of these companies will get prompt attention —

The · WATKINS CONTAINER · Manufacturers

# Research work is leading to better carloading methods

## conclusion of a three-part article on test information and practical results of extensive carloading and load testing experiments

*by A. N. Perry* • *FIELD RESEARCH AND ENGINEERING, SIGNODE STEEL STRAPPING CO., CHICAGO. MEMBER, LOADING RESEARCH DIVISION, NATIONAL SAFE TRANSIT COMMITTEE*

finish The first part of this three-part article contained basic information on how research work was used to run down difficult-to-find causes for packaging and carloading problems of appliance manufacturers. Case histories were then presented to show how four leading appliance manufacturers improved their carloading methods and reduced shipping damage to their packaged products.

From the information presented, the reader may have noticed that causes for loading, bracing and container failures in most instances have a marked similarity. Furthermore, that the methods used to overcome these deficiencies, too, have a familiar ring. This is altogether true. And there are good reasons for it. First, generally, loading, bracing and gate construction follow definite principles born of inherent strengths. Container construction, too, follows a set of principles of construction which have proved best in the long run after many, many tests. That makes all shippers "brothers under the skin." Only the difference in types of lading

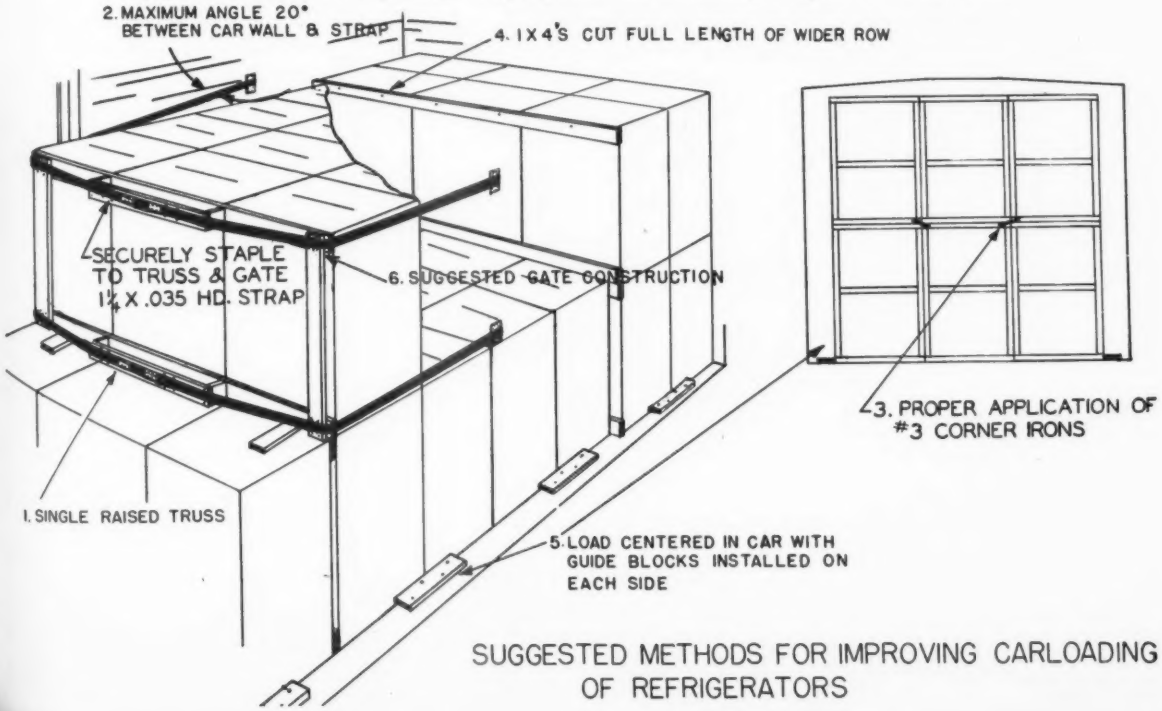
*to Page 74* →

**A Statement from Sears, Roebuck and Co.**

"We went all out to develop a container and loading method that would deliver a maximum number of stoves in an undamaged condition because we knew that licking the loading problem is more important than collecting claims. Claims can only reimburse for the actual damage to the merchandise and that leaves the consignee the measurable and intangible costs of handling claims and damaged merchandise that can exceed the amount claimed against carrier.

J. C. Allen
General Traffic Manager

*Load, after being centered in car with guide blocks, is strapped with 1¼ x .035" strap secured to anchor plates halfway back in each end of the car. Top layer at the center of the door is strapped as a separate unit. Flexure of gate is eliminated by passing strapping over and tensioning it against a "box" truss.*




SUGGESTED METHODS FOR IMPROVING CARLOADING OF REFRIGERATORS

# ATA shipper-carrier-receiver meeting

## citation for "outstanding contribution to safe transportation" made to National Safe Transit Committee

DURING the American Trucking Association's National Freight Claim Council's annual membership meeting, held in Detroit, June 19-22, one day was devoted to ATA's annual Shipper-Carrier-Receiver meeting. In attendance were representatives of appliance and automotive manufacturers, and other large shippers, as well as truckers and receivers.

The morning session was devoted to a round-table discussion on "claim progress," with shipper-receiver representatives telling what they think is wrong with carrier claim handling, service and prevention, and suggesting steps for improvement. In turn, the carrier representatives had their says in telling the shippers how they can help the carriers do a better job.

Several complaints were voiced about the carriers' attitude toward "concealed damage" claims. It was stated that the stock answer is "this was a concealed damage and we are not responsible." The shippers urged thorough inspections.

A representative of Nash-Kelvinator stated that "claim clerks of motor carriers are overworked — perhaps the claim form could be cut down." He pointed out that carriers could use a short form bill of lading.

John M. Miller, the Council's secretary, observed that shipper traffic managers often keep claims "open" after a carrier has turned them down, so that some of the charges that motor carriers are not paying attention to claims do not give a "true picture." He said "we intend to go before the ATA Executive Committee on some of these matters—interline claims and 'over' marked freight—and reach top management."

A Chrysler spokesman suggested these solutions to several problems (1) all carriers should answer correspondence promptly, (2) transfer information on bill of lading to a freight book, and (3) improve inspection of freight.

In general, the "claim progress" meeting brought out that new emphasis must be put on better claim handling, which must run parallel with "continuance of the fine work on claim prevention."

At the luncheon meeting, guest speaker was A. W. Schwietert, general chairman, National Management Committee of Shippers Advisory Boards, Chicago. The speaker said that a "fault" of claim prevention programs seems to be that "we talk entirely too much in general terms and fail to emphasize the effect of loss and damage on the business of both the shippers and the carriers."

Motor carrier reports for 1950 are not yet complete, he stated, but figures received from 120 common carriers of general freight show a reduction from 1.14 to 1.11 in the ratio of claims paid to gross revenues. For 995 Class I carrers, for 1949, the ratio was 1.99, he pointed out, giving the total amount paid by those trucking companies as $24,482,331.

But, Schwietert cautioned, these statistics do not tell the whole story. They do not include the total economic loss to the shipper, he said, recalling that last year a survey among shippers showed the average cost of filing a claim to be approximately $3. The carriers cost for handling and investigating a claim is much greater, he said, adding there is also the cost that results from loss and damage for which on claims are filed since the cost of filing and processing exceeds the amount of the claim.

### 40% of net income "wasted"

"For the 120 carriers reporting in 1950," stated Schwietert, "the amount paid for loss and damage was 22% of the net income. For the 995 carriers reporting in 1949, the amount was 39.9% of net income. In other

*Ray G. Atherton, general manager, American Trucking Associations, presenting citation to Ralph Bisbee, general chairman, National Safe Transit Committee (see photo of plaque on Page 41).*

*W. B. Keefe, member of National Safe Transit Committee Advisory Staff representing ASTM, is shown demonstrating vibration testing machine before ATA meeting. At left is model of Conbur incline impact tester.*

words, nearly 40¢ out of every dollar of net income was wasted because of careless preparation or handling of shipments." It would have required $1,077,222,564 of new business to have provided enough net income to make up the amount paid out for claims loss, according to the speaker.

Schwietert listed the principal causes of freight loss and damage in the following order of importance: rough handling, improper loading, pilferage, damage from rain or snow, poor checking at terminals, carelessness on part of carrier, defrosting in transit, poor checking at shippers' or consignees' platforms, poor equipment, too much handling, improper packing, and indifference on part of carrier employees.

His suggestions, which he said were received from shippers, are: (1) give notice to shipper of the condition of goods upon arrival, (2) reject shipments when they do not meet packing or loading specifications, (3) concentrate on the packing and handling of less-than-truckload freight, (4) improve the type of inspectors' reports, and (5) avoid the use of second-hand containers.

### ATA Freight Claim Council citation to Safe Transit Committee

A citation for "outstanding contribution to safe transportation" was awarded to the National Safe Transit Committee by the ATA National Freight Claim Council during the afternoon session.

The presentation of the plaque was made by Ray G. Atherton, general manager of ATA, to Ralph Bisbee, of Westinghouse Electric Corporation, Mansfield, Ohio, general chairman of the National Safe Transit Committee.

The presentation followed an afternoon program presented by members of the Coordinating Committee of the National Safe Transit group, during which the complete NST pre-shipment testing plan and the concept and results of the program were explained to all those in attendance at the ATA session.

The National Safe Transit program before ATA was coordinated by Dana Chase, editor and publisher of *finish* magazine, where the idea of the present National Safe Transit Program had its inception. Others participating in the program were Ralph Bisbee, general chairman; E. H. Shands, Geo. D. Roper Corporation, chairman, Technical Planning Division; P. W. Bush and W. B. Keefe, Westinghouse, chairman of the Technical Planning Subcommittee and member of the Advisory Staff, respectively. The Porcelain Enamel Institute, coordinating organization for NST, was represented by R. A. Dadisman, Armco Steel Corporation, Institute president; Edward Mackasek, PEI secretary; and John C. Oliver, PEI assistant secretary. Both Mr. Mackasek and Mr. Oliver hold their respective offices on the NST Coordinating Committee also.

### Motor carriers commended for employee educational programs

At the shipper-carrier-receiver banquet, Edward F. Lacey, executive secretary, National Industrial Traffic League, commended the motor carriers for their educational programs they have sponsored among their employees for the past two years. He remarked that he was particularly impressed with the methods used to enlist the cooperation and support of the employees themselves who do the physical handling and stowing of freight. However, unless top management evidences a whole-hearted interest in claim prevention campaigns, he said, it is most difficult to enlist the support of those who are charged with the actual handling of the shipments. But where employees are encouraged in their endeavors, they cannot help but take pride in their accomplishments, he reasoned.

### Use of incentive contests to gain interest and cooperation

Incentive contests and cash awards have proved helpful, he reported. Contests between various divisions of a company, and other measures to gain the interest and cooperation of those actually engaged in the handling of shipments, are well worthwhile and pay real dividends, concluded Lacey.

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## 1952 PACKAGING EXPOSITION TO BE HELD IN ATLANTIC CITY

The 21st National Packaging Exposition will be held in Atlantic City, N. J., April 1-4, 1952, Lawrence A. Appley, president of the American Management Association, sponsor of the event, has announced.

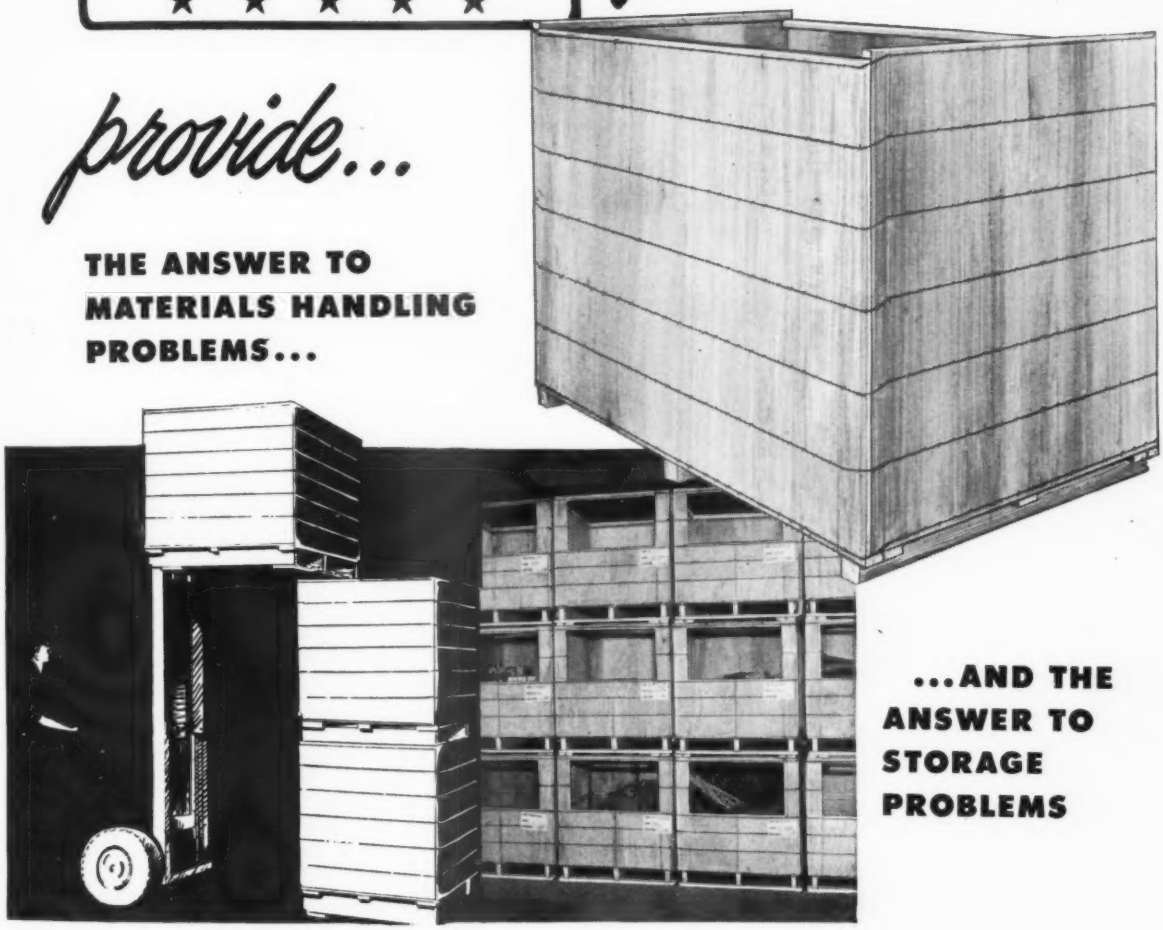
"In accordance with the recommendation of the Exhibitor's Advisory Committee for geographical mobility of the show," said Appley, "AMA has concluded arrangements to have the Exposition in Chicago in 1952, and has tentatively established a schedule providing for alternating showing annually between Chicago and the East."

# Generalift pallet boxes

★ ★ ★ ★ ★

## provide...

**THE ANSWER TO MATERIALS HANDLING PROBLEMS...**



**...AND THE ANSWER TO STORAGE PROBLEMS**

***FOR LARGE BUSINESS***
***FOR SMALL BUSINESS***
***FOR ALL BUSINESS!***

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This colorful booklet illustrates and describes the many advantages of the Generalift Pallet Box. We will be glad to mail upon request.

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***engineered shipping containers***
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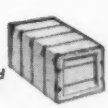
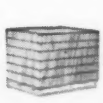
General Wirebound Crate


General Nailed Box


General Corrugated Box


General Cleated Corrugated Container


General All-Bound Box

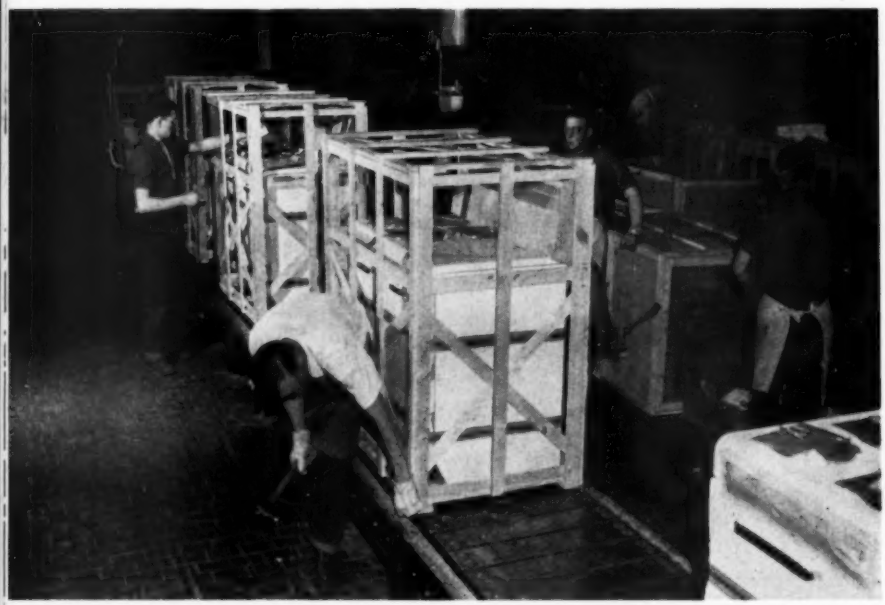

Generalift Pallet and Pallet Box


General Watkins-Type Box

# Frigidaire uses tunnel conveyor system for handling finished products

## photo story of a unique method of consolidating finished products at a common shipping point from widely scattered plant locations

WHEN the Frigidaire Division of General Motors first occupied its huge Moraine City (Ohio) plants, shipping was handled from a half-mile long loading dock along one side of the main building, with tracks running outside the building but under a roof. It was common practice then to truck refrigerators, water coolers, ice cream cabinets and other products from all plant areas to this common loading dock.



*Above: Frigidaire workers are shown finishing the crating of new electric ranges as assembly line approaches the entrance to the tunnel conveyor system.*

*Below: Workers shown driving the last nail into a crate and applying final approval tags as refrigerators leave assembly line and approach tunnel mouth.*


Today the one-half-mile outside loading dock is used for incoming freight only, and loading operations take place within the plant itself, where the in-plant loading dock is served with a tunnel conveyor system.

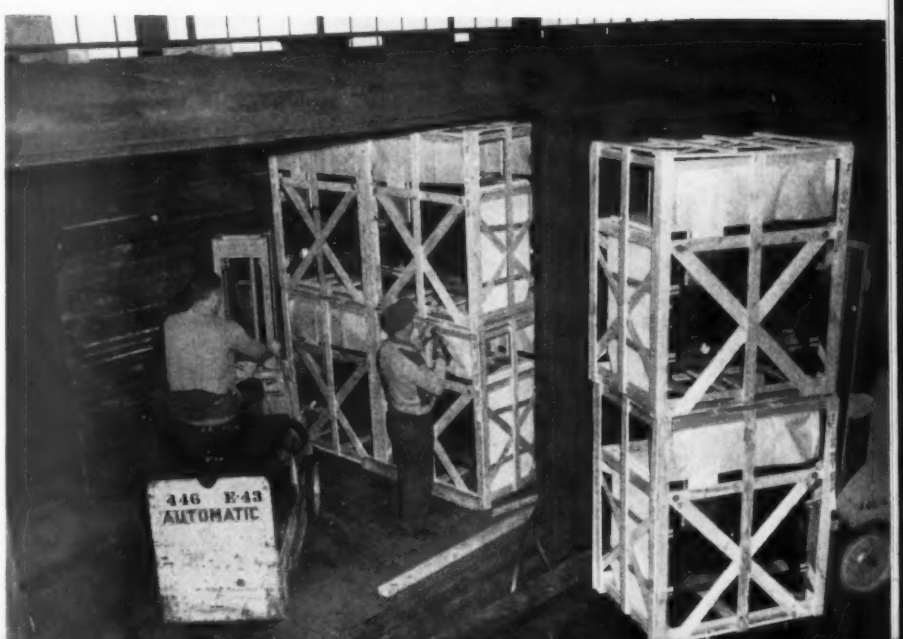
The tunnel itself is more than a block long, 737 feet, to be exact. Two "main" lines and seven converging "feeder" lines from various strategic points make up the system. This giant conveyor system moves thousands of Frigidaire products to freight cars waiting to carry them to marts throughout the country. The conveyors move the finished products on the feeder lines to the main conveyor, and the crated products are carried under railroad tracks between two buildings, where they are loaded aboard freight cars inside the plant. The photos in this group show the handling of electric ranges and refrigerators, from the production division into the tunnel, how the conveyor system is engineered to "feed" branch lines into the main conveyor, and, finally, handling and carloading methods at the loading dock.

All equipment within the tunnel is automatic, and no one is allowed in the tunnel except authorized maintenance employees.

Plant men and engineers reading *finish* can readily visualize the great amount of individual handling of the valuable finished appliances which has been eliminated through this engineered conveyor system.

*Right: Products move through the 737-foot-long tunnel, which separates two buildings, and are loaded aboard freight cars inside the plant.*

*Above: An over-all view of three feeder lines merging with the main line deep inside the long tunnel.*




*Right: Crated electric ranges are loaded aboard a freight car, illustrating the final step in the freight handling operation.*

## Research is leading to better carloading . .

→ *from Page 67*

makes each problem of packaging, carloading, bracing and unloading different.

The improvements in shipping practices which have been described could not have been accomplished without the full cooperation of the shipping personnel of the companies referred to, the field engineers for supply organizations, and those responsible for laboratory and field testing. The field engineer brings the broad experience acquired in many shipping rooms. The shipping and materials handling organizations of the manufacturer contribute the knowledge of the problems peculiar to *their* packaged products. The usual result of such cooperative effort is a successful project.

## WOODEN BOX ASSN. HOLDS 52ND ANNUAL MEETING

Information developed at National Wooden Box Association's 52nd annual meeting, in Washington, D. C., June 14-15, indicates the wooden box and crate industry will meet defense and essential container needs within limits of present production capacity, barring future demands beyond anticipated limits.

Manufacturers from all wooden box and crate producing areas in the country met in membership sessions and with government executives to make plans intended as a basis for planning cooperative action. Government representatives included officials from Department of Defense, newly established control agencies, and the U. S. Department of Agriculture.

Best estimates indicate a sharp upturn and subsequent leveling off in ammunition box demands during 1952. Although the level expected to be reached next year would be 75 per cent over present level, there was expressed no doubt but what the industry's capacity will be able to satisfy direct needs under the country's mobilization plan, as well as needs classified as essential.

Several factors will contribute to the production increase possible under industry's present plant capacity. In the first place, lumber supply situation will ease due to working out of seasonal production problems. Secondly, decreased apple box production in the Pacific Northwest area will release footage for other food containers. This slackening of demand will make production available for other types of wooden containers.

Probably the greatest problem facing manufacturers of nailed wooden boxes and crates is the sky-rocketing prices of stumpage. Discussions held during the sessions reveal that the most critical situation and the biggest area of doubt lie in these costs. The wooden box and crate industry, large user of low grade lumber, is at a great disadvantage during periods of high lumber prices such as are encountered at the present time.

It appeared in several instances that reported shortages of wooden containers were of a regional and short-time nature. As an example, a National Production Authority official reported a shortage of forming cheese boxes used by manufacturers of processed cheese as a reusable container for storage, rather than as a shipping container. Members attending the session indicated the demand could be met in any box producing area.

Discussions revolving around ammunition box production were led by Lt. Col. Gerard W. Mulder, chief, Material Division, Ordnance Ammunition Center, Joliet, Illinois. Members participated in round table discussions with Charles Lewis, acting director, Containers and Packing Division, National Production Authority. He was accompanied by A. D.

### MEASURES TO BE TAKEN TO PREVENT PRODUCT DAMAGE RESULTING FROM HANDLING

The following ten recommendations, made by the National Freight Loss and Damage Prevention Committee of the Association of American Railroads, to car unloaders and warehousemen, should also be of interest to manufacturers in connection with the handling of their packaged products in warehouses, and in connection with carloading. The recommendations read as follows:

1. When it is necessary to stand on crates or cases of lower tiers in order to reach merchandise from above, always place a plywood platform (preferable ⅜ inch sheathing fir plywood) on the lower tier. This will not only insure safe footing, but will prevent the container on which you are standing from depressing or collapsing, since any excessive weight will be more evenly distributed.
2. In lowering heavy cases from an upper tier, skid them to the lower level by means of a plank. This will better enable you to control the speed of descent, and thereby prevent unexpected drops which can cause injury to fellow workers as well as damage to the merchandise.
3. Broken crates are to be repaired before being stacked. Otherwise they may further collapse and topple to the floor.
4. Steel strapping used in bracing cars should be completely removed. Pieces left in cars can cause injuries to employes or scratch merchandise.
5. Where help is necessary to handle heavy items, never attempt a "solo."
6. Make certain that you have a firm hold and that the lift or pull be gradual.
7. Merchandise should not be dragged across the floor. Use a two-wheeled truck, a dolly, a pallet truck or other aid.
8. Never use a two-wheel hand truck as a battering ram. The lip of this truck has been a source of too much damage. Set the item down. Then "walk" it in place.
9. Be careful when setting items in place for storage or uncrating.
10. Aisles must always be kept clear to allow sufficient room to move items to their storing place without bumping into other merchandise that is stored on either side of the aisle.

# For Civilian or Defense Products

## a low cost Collapsible Pallet Box

### *Engineered to meet your requirements*

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Here's a money saver for in-plant storage and handling of materials and for outside shipments too. Its low initial cost will save thousands of dollars for plants using pallets in quantity.

check

The B-G Collapsible Wood Pallet Box is light in weight but built strongly enough to handle weights up to 5000 lbs. and is rugged enough to stand up under many repeated shipments.

check

The collapsible feature is made possible by the exclusive Bigelow-Garvey TIGHT CORNER hinge design used on all of our collapsible wood shipping crates.

Used as a storage box, a tote box or as a shipping container, you will like this sturdy but inexpensive addition to effective materials handling.

**Photo shows how standard pallet box is easily attached to any standard pallet by means of 4 corner irons and a single steel strap, either flat or round.**

**Photo shows hinged box collapsed for storage or return shipment. Tops can be furnished if desired.**

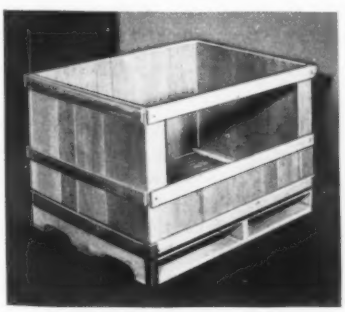

**Photo shows removable panel type for warehousing. Contents accessible when pallet boxes are stacked one on top another.**

Kraft Crate | Tight Corner Hinge Crate | Pallets | Pallet Boxes | Wooden Boxes | Six Section Panel Crates

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Zachary, acting chief, Containers Branch, and A. I. Topping, CMP reviewer.

Problems of price stabilization were discussed in open forum with Norman O. Cruver, chief, Lumber and Wood Products Branch, Forest Products Division, OPS, and Stanley Craven, head of the Wood Container Section.

It was estimated that less than 25 per cent of current output of industrial wooden containers is subject to DO ratings and, therefore, that the industry's output is still largely designed to serve the civilian economy. Despite anticipated increase in demand for the industry's products by defense agencies, H. H. Pein, association president, pledged the industry's support in maintaining a strong civilian economy.

## HOW YOU CAN HELP ALLEVIATE THE FREIGHT CAR SHORTAGE

Defense Transport Administration Director Knudson's 10-point program for conserving railroad equipment:

1. By removing all packing material and dunnage at the time the car is made empty.
2. Loading and unloading cars promptly.
3. Loading heavier wherever possible.
4. Avoid using freight cars for storage purposes.
5. Help blot out loss and damage.
6. Order only the number of cars needed for immediate use.
7. Avoid contamination of Class A cars.
8. Pay careful attention to the selection of cars for commodity loading.
9. Cooperate wherever railroads find six-day week operation expedient.
10. Minimize circuitous routing.



## SIGNODE SALES REPS. IN KENTUCKY, WASHINGTON

Signode Steel Strapping Co., Chicago, has announced the appointment of Herbert F. Gunnison as sales representative in the Louisville (Ky.) area, and C. A. Carter as representative in the Seattle (Wash.) area. Both men have had experience and on-the-job training in latest methods of package protection, car loading and car bracing, and are familiar with government specifications for shipping.

## FOREIGN PACKAGERS STUDY U.S. METHODS

Packaging experts from seven European countries met recently to discuss results of a tour they had made of 25 paper products plants in 14 U.S. states.

The group of 17 experts was sponsored by the ECA to study U.S. packaging methods. The packagers seemed most impressed by the free exchange of ideas among U.S. competitors. They predicted their tour would result in greater standardization of packaging methods in Western Eur-

opean countries, but pointed out that high prices and limited supplies from non-European sources would make progress slow. The group was worried about supplies of pulpwood, which is the raw material in European packaging and comes from the northern part of Europe, as Sweden is exporting large quantities to the U.S. and the price on overseas supplies is high.

In general, the packagers felt their study here would speed up improvement of European paper and paperboard methods and recommended the elimination of trade barriers and introduction of greater integration to get mass production.

## 17 CERTIFIED SAFE TRANSIT LABORATORIES

The following 17 testing laboratories have been certified by the National Safe Transit Committee. Manufacturers, who do not have Safe Transit testing equipment in their own plants, may have their products tested under Safe Transit procedures at any one of these laboratories.

Atlas Plywood Corporation
Lawrence, Massachusetts

American Gas Associations Labs.
Los Angeles, California

Chicago Mill and Lumber Company
Chicago, Illinois

Container Laboratories, Inc. (2)
Chicago and New York City

Cozier Container Corporation
Cleveland, Ohio

The Fairfield Paper & Container Co.
Baltimore, Ohio (project 1-a only)

General Box Company
Chicago, Illinois

The Hinde & Dauch Paper Company
Sandusky, Ohio

Inland Container Corporation
Indianapolis, Indiana

International Paper Company
Georgetown, South Carolina

Ohio Boxboard Company
Rittman, Ohio

Package Research Laboratory
Rockaway, New Jersey

Packaging Service Corporation
Wyncote, Pennsylvania

The Don L. Quinn Company
Chicago, Illinois

Rathborne, Hair and Ridgway Box Co.
Chicago, Illinois

U. S. Testing Company, Inc.
Hoboken, New Jersey

## Maintenance by metallizing

→ *from Page 26*

the entire coating thickness may be applied in a single pass; in other jobs, several passes may be required to build up the required thickness. Speed of the work surface past the gun should be sufficient to prevent an undue rise in temperature. Work temperature should never become high enough to burn if touched quickly with the bare hand. One great advantage of the metallizing process is its ability to rebuild parts without affecting metal temper. This is not possible when rebuilding with a welding torch.

To top off the possibilities inherent of metallizing, one metallizing equipment company has recently perfected a wire which may be sprayed on a surface, then actually fused with the surface by heating the sprayed part to above 1600° F. This may be compared to rebuilding by fusion welding, though control of coating thickness, thus minimizing final refinishing, is much simpler when using the metallizing gun.

### Methods for final finishing

Final finishing of the sprayed coating depends upon its intended use and the hardness of the spray alloy used. When aluminum or zinc coatings are applied over steel to act as a corrosion preventive coating, wire brushing the finished spray coat is recommended. This brushing action aids in sealing the pores inherent of the spray metal and makes it more impervious to exterior influences. When aluminum is applied on a steel part to increase its heat resistance, the part is heated to approximately 1600° F. to produce some fusion between the aluminum and the steel. The net result is a complex ferrous-aluminum alloy that is highly resistant to heat oxidation.

When rebuilding circumferential surfaces, enough spray metal must be applied to allow final machining, grinding, reaming, or burnishing to size. The softer spray metals, such as aluminum, zinc, copper, bronze, lead, babbit, or the low carbon steels, can easily be machined to size. The high carbon and stainless steels must be ground to finish dimensions. The best techniques to employ in each case are best developed through experience, though very little difficulty will be encountered by the experienced shop man.

**Editor's Note:**

**The author researched the use of sprayed aluminum to replace cadmium plating on airplane engine mounts as a protection against corrosion while he was with Douglas Aircraft. (The process was later approved by both the Army and Navy.) He is well versed in the early development and later refinements in the metallizing process.**

**The author has not attempted to include all of the technical details of metallizing, but instead has presented possible uses which will lead the engineer and practical plant man reading *finish* to visualize applications in his own field.**

**If additional technical details concerning the metallizing process are desired, write to *finish* on your company letterhead.**

The cost of maintenance and salvage by metallizing, both in dollars and time, will come as a surprise to those not familiar with the process. To begin with, the entire cost of all equipment necessary to employ metallizing, including surface preparation equipment, the metallizing gun, and all accessories, is less than that of a single engine lathe. This equipment can be made portable and moved about the shop as required, or it can be set up in a fixed location. Portable equipment is naturally more versatile and may result in some outstanding cost and time savings.

### The advantages of portable equipment

One advantage of portable equipment is that it can be taken to the job site, and often a part or machine element can be rebuilt without disassembling it from the machine. Large

**Table No. 1**

Corrosion preventive coatings of aluminum or zinc have proved very successful on the following equipment. The normal life expectancy of these coatings varies from 10 to 40 years.

| | |
|---|---|
| Bridges | Piping |
| Girders | Water tanks and chests |
| Steel structural units | Pump parts |
| Outside storage tanks | Turbine parts |
| Solution tanks | Gas line piping |
| Metal spray booth walls | Sheet metal shop equipment |
| Solution handling baskets | |

**Table No. 2**

Heat resistance coatings of sprayed aluminum have been used successfully on:

| | |
|---|---|
| Steel furnace parts | Grates |
| Oven components | Pyrometer equipment |
| Burners | Cylinder heads |
| Melting pots | Hot forming equipment |
| Ladles | Rivet pots |

**Table No. 3**

Representative machine parts and machine elements that can successfully be salvaged by metallizing:

| | |
|---|---|
| Air compressor parts | Packing glands |
| Air hose couplings | Patterns |
| Armature shafts | Pistons |
| Axle shafts | Plug cocks |
| Bearing fits | Plungers |
| Boring bars | Power rods |
| Brake drums | Propeller shafts |
| Camshafts | Pulleys |
| Crankshafts | Pump packing sleeves |
| Cylinder liners | Pump plungers |
| Fan shafts | Roll journals |
| Gear fits | Rolls |
| Gibs | Rudder stocks |
| Gland sections | Shafts (all kinds) |
| Hydraulic rams | Spindles |
| Impellers | Squeeze rolls |
| Journals | Turbine shafts |
| Lathe beds | Turbine journals |
| Mandrels | Water wheel runners |

## CLASSIFIED ADVERTISING

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**Address reply to Box 851, c/o *finish*, 360 N. Michigan Ave., Chicago 1, Ill.**

WANTED — Man experienced in selling Ceramic materials.

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rolls that must be rebuilt, or worn journal surfaces on large rotors are illustrations in this case. Such parts may be rebuilt while still in the machine, then finish sized by means of a portable grinder. Portable equipment can also be moved about the plant to apply corrosion preventive coatings on various steel structures, or on fixed equipment such as solution tanks, spray booth walls, etc.

### Salvage costs less than 10% of replacement costs

Actual illustrations of possible cost savings are interesting. One company salvages machine spindles that cost $110 each at a total metallizing cost of $2.75 each. Furthermore, the salvaged spindles, because of the self-lubricating properties of the spray metal, last longer than new replacements. Another company salvaged a $2500 compressor shaft at a cost of $7.81, including labor. In one large company where metallizing is used extensively, salvage costs average less than 10 per cent of replacement costs, and the salvaged parts usually have more wearability than new parts. Furthermore, metallizing is 80 per cent cheaper than any other salvage method available.

Tables No. 1, 2 and 3 with this article, listing a few proven applications of metallizing under the three general categories of uses, are only illustrative of hundreds of more similar applications. A glance down the tables will bring to mind other applications within the sphere of any

## ADVERTISERS' INDEX



***"I saw your ad in finish"***

shop maintenance man's experience.

There is every chance that shop maintenance and salvage work will become even more vital in line with the stepped up defense program. Replacement machine tools and tool elements will become more difficult to obtain, while production demands, in the interest of national security, will continue to soar. Based on results obtained during World War II, it is logical to assume, on the basis of improved equipment and materials, that metallizing will play an important role in keeping production moving.

## MAY WASHER SALES DOWN

Factory sales of standard-size household washers in May totalled 253,942 units, a drop of 13.1% from 292,193 in the preceding month and down 16.6% from 304,640 sold in May, 1950, according to AHLMA.

Sales of automatic dryers aggregated 32,292 units, compared to 32,960 in April, or 2% less, and were 100.3% higher than 16,122 in May, 1950.

Ironer sales in May amounted to 24,200 units, up 2.1% from 23,700 in the preceding month and off 11.7% from 27,400 sold in May, 1950.

## MAY GAS CENTRAL HEATING SHIPMENTS TOTAL 37,000

Shipments of gas-fired central heating equipment totaled 37,000 units in May, bringing the first five months total to 245,700, according to Edward R. Martin, director of marketing and statistics, GAMA.

May shipments were: gas-fired furnaces, 22,700; gas boilers, 3,500; and conversion burners, 10,800 units. The breakdown for the five-month period was: gas-fired furnaces, 161,900; gas boilers, 28,600; and conversion burners, 55,200 units.

## STEEL PLUMBING SHIPMENTS SHOW 58% INCREASE

Manufacturers' shipments of porcelain enameled steel plumbing fixtures during the first quarter of 1951 were valued at $18.8 million, according to Porcelain Enamel Institute, an increase of 58% over the first quarter of 1950, compared to a 52% increase for all types of plumbing fixtures.

Porcelain enameled steel plumbing fixtures shipped during the first quarter of 1951 included 82,491 lavatories, 432,797 kitchen sinks, and 113,954 bathtubs. Porcelain enameled steel fixtures accounted for 20% of total plumbing fixture shipments.

## LEWYT BUILDING $3.8 MILLION PLANT IN LONG ISLAND

The Lewyt Corporation, manufacturers of vacuum cleaners, and since 1888 contract manufacturers for other companies and the Armed Services, has announced plans for construction of a $3,800,000 plant in North Hempstead, Long Island, N. Y.

## AMERICAN CYANAMID TO EXPAND FACILITIES

An expansion of facilities for production of basic chemicals at Niagara Falls and Welland, Ontario, was announced by A. O. Williams, vice president, North American Cyanamid, Ltd. Williams said the expansion was made necessary by increased defense and civilian demand. A further expansion step will be the installation of equipment to increase American Cyanamid capacity for production of melamine at Willow Island, W. Va.

***Combination telescopic kitchen-bath** — suggested for homes without bathrooms. The holder of the patent on this innovation, John A. H. Siers, of Jersey City, states that the telescopic-type tub is the counterpart to the davenport couch for homes without bedrooms.*